EMPIRE™ Deluxe

THE OFFICIAL STRATEGY GUIDE

★ THE DEFINITIVE GUIDE TO THE EXCITING COMPUTER GAME OF STRATEGY AND CONQUEST

★ INCLUDES STRATEGIES TIPS AND ADVICE ON WHERE TO FIND LIVE OPPONENTS TO PLAY AGAINST!

NEW WORLD COMPUTING, INC.

ALAN EMRICH WITH MARK CARROLL

WRITTEN IN CLOSE ASSOCIATION WITH WHITE WOLF PRODUCTIONS, INC.

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EMPIRE DELUXE

The Official Strategy Guide

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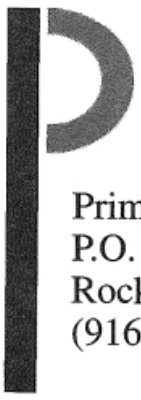
EMPIRE DELUXE

The Official Strategy Guide

Alan Emrich

Mark Carroll



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Dedication

Alan Emrich wishes to dedicate this book to his great teachers, J. W. Schlatter, Karen Miller, Robert Wilkoff, and Dr. David Hood. Each taught me more than scholastics—they taught me the value of myself. And to Susan Howell who helped me with the hardest lessons of all—post-graduate studies in life.

Mark Carroll wishes to dedicate this book to all those who distracted him while he should have been writing.

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Since a good deal of technology aided all the parties concerned in putting out this book, the authors would like to begin by thanking Alexander Graham Bell for inventing the telephone. Without it (and the modems that our computers possess, and the computer networks that support our modems, and the people who use those networks that . . . well, you get the idea), our world would be a far more lonely place and this book would have suffered greatly. We would also like to thank Charles Babbage for inventing the computer, thus giving us this terrific tool and toy to play with for all these years.

Next, we must thank Walter Bright for getting the ball rolling back in 1977 on what would eventually become *Empire Deluxe*. Appendix A tells the tale of what he started, and quite a tale it is!

Mark Baldwin and Bob Rakosky of White Wolf production deserve the highest possible honors. Not only did they design and develop Empire Deluxe, but they consented to read every chapter of this book as it was written and offered important suggestions and comments along the way. Without their sharing of "programmer secrets," much that is revealed in this book would have remained a mystery. Their good natures and the voluntary customer support they've done on networks such as GEnie, CompuServe, and Prodigy have given us some terrific quotes to use throughout these pages. (No doubt the authors now owe them several drinks.)

Things, however, don't get published without publishers. Therefore, we'd like to thank Prima Publishing for taking a chance on a computer strategy game book (when another fantasy or flight simulator book would have been safer to publish from a sales standpoint). Their staff is always a pleasure to work with.

New World Computing, which published *Empire Deluxe*, deserves special kudos. When they said we would get 1000 percent support from

them, they weren't kidding. Jon, Steve—the only way we could repay you was to write one helluva book about the game you published. We hope you're not disappointed.

Among publishers, however, one stands out who supported us with patience, encouragement, and many office supplies. Russell Sipe of Golden Empire Publications has, for over 12 years, been the publisher of *Computer Gaming World* magazine (where Alan Emrich works as the on-line editor). By graciously allowing for the occasional disruptions that writing a book can have on the fax machine or printer (and he knows all about them since Russell has written a few books himself, including Prima's *Chuck Yeager's Air Combat Handbook*), he helped keep things running smoothly.

If any medals are deserved for help with this book beyond the call of duty, one would have to go to Walter Luc-Haas in Switzerland. A retired professor and lifelong scholar, Walter has been actively publishing material on strategy games since the 1970s. His proofreading and critiques helped tremendously, often presenting us with a page of notes and commentaries for every page of text he examined. His turnaround time was short, for we corresponded electronically over CompuServe. Many, many thanks, Walter.

Some other key people gave us some important direct input. Johnny L. Wilson, editor of *Computer Gaming World* magazine, helped us to organize the story of *Empire Deluxe* found in Appendix A. With his vast knowledge of the computer-game industry's own history, he was able to add several important nuances and character names to what has become a fascinating story.

Jennifer Schlickbernd, too, helped us with that history by tapping into the InterNet and getting us a listing of their many "empire" games and variations. We also want to thank Rob Wallace. Not only did he do the music and sound for *Empire Deluxe*, he was gracious enough to share his story with us in Chapter 16.

There were several indirect contributors to this book as well. They are represented in this book primarily because of their efforts in our previous book (also from Prima), *Global Conquest: The Official Strategy Guide*. Thanks, then, to Roger "Roger-Tzu" White for his diplomatic help in Chapter 13 and to Frank "Turk" Bartolotta for his modem mystery solving in Chapter 12.

Finally, but most important of all, Alan Emrich needs to thank his new wife, Julie, and his seven-year-old son, James. Although Alan and Julie were married on December 27, 1992, she scarcely saw him until April, when the book was finished. When Mark Carroll flew out from New York to be at their wedding in the Los Angeles area, he and Alan worked on the book every minute until they left for the church. When they called Bob Rakosky with a few, critical book-related questions 90 minutes before the ceremony, Bob thought (perhaps rightfully) that Alan was off his nut, working on a book at a time like this.

Honeymoon? What honeymoon? Alan spent it hunched over the keyboard grinding out another chapter of this book. Even at the L.A. game convention in February that he attended with his family, Julie and James went to play in the many events and tournaments while Alan stayed in the hotel room and kept slaving away on the new lap top they'd bought, just so he could keep on schedule. Therefore, we owe many thanks to Julie and James for their undying love of a workaholic game writer.

How to Use This Book

Empire Deluxe: The Complete Strategy Guide is a Mulligan stew of gaming information. Being neither a pure primer, reference, history, strategy, nor hint book, it strives to blend the essential elements of all these into a single gaming manifesto that will allow players greater enjoyment of one of computer gaming's most durable success stories.

This book assumes that players already own a copy of New World Computing's *Empire Deluxe* game and have installed it properly. Furthermore, the authors are working on the assumption that owners have a mouse installed on their computer and are not loath to use it during the tutorials. (The tutorial scenarios for this book, by the way, have been thoughtfully included on the original *Empire Deluxe* game disks. Thus, if you've installed the game, you're ready for everything this book has to offer.)

PUTTING THE "STRATEGY" BACK INTO STRATEGY GAMING

While *Empire Deluxe* is not a complicated game to learn (particularly in comparison with other games of its genre), it is particularly absorbing in its strategic nuance. This book will help build and reinforce your knowledge of the Basic and Standard Games while striving to develop your mastery of the Advanced Game. More importantly, it will instill in you the principles of sound strategic thought—the kind that wins wars (and war games like *Empire Deluxe*).

That is the key focus here, *strategic thought*. Sure, there are several tactical tips and unit-by-unit, square-by-square techniques that we will present here—and these will give you that little extra edge in battle. However, it is knowing what it takes to win the game in terms of *strategy* that sets this book apart. All the "Fancy Dan" tactical techniques in the world won't win wars. They can give you an edge in battle, but if the

battlefield is not carefully chosen, history has repeatedly shown that it is more than possible to win the battles and still lose the war. Thanks to this book, you'll be able to win more than your share of *both* the battles *and* the wars!

AN ADVANCED-GAME FOCUS

The ultimate goal of this book is to make players masters of the Advanced Game of *Empire Deluxe*. Consequently, the teachings in every subject found in *Empire Deluxe: The Official Strategy Guide* primarily focus on playing the Advanced Game. While nothing has been omitted concerning either the Basic or Standard games, the bulk of this tome, from the tutorials forward, is dedicated to making its readers among "the best of the best" *Empire Deluxe* players—and that means masters of the Advanced Game.

While this book is able to ease anyone into being a casual player of *Empire Deluxe*, its authors know that the usual effect this game has on new players is to give them an instant addiction to it. We've watched this addiction to playing *Empire* happen to several of our friends (just as it happened to us). With a belief that it will happen to you, too, once you start pushing the pieces around while playing *Empire Deluxe*, we've written this book to give you exactly what you'll need after the addiction starts. When that occurs, this book will be your mentor through the many pleasurable hours you'll have ahead playing *Empire Deluxe*.

HANDS-ON LEARNING EXPERIENCES

We've made a special effort to teach and reinforce many of the lessons in this book by using a proactive, hands-on approach. The tutorial chapters have been carefully crafted to move players through a series of three games (Basic, Standard, and Advanced), with an emphasis on learning by doing. The text is written in an angel-on-your-shoulder style that we tested on both neophytes and veteran *Empire* players. Even the experienced *Empire* players, we're happy to report, learned some important things in the tutorials. We have also used the tutorials as a common reference point for the book's teachings, and refer to them often.

However, we don't just leave you to wade through the rest of the book and try to absorb it all after the tutorials have been completed. Chapter 11 was especially written to take players *back* to the final tutorial scenario and analyze it, in great detail, as it is played through again. All of the comprehensive techniques for savvy play presented in Chapters 5–10 are brought to life in a re-examination of this challenging tutorial scenario. Thus, the proper playing techniques are all underscored, again using a hands-on approach. We even take a look at the opening moves of the traditional *Empire Deluxe* scenario, just to make sure the lesson is complete.

FRIENDS ARE THE NAME OF THE GAME

After you develop a full understanding of the way the game "thinks," learn some brilliant tactics, and develop the strategic mind of a Great Captain, you will find yourself seeking greater challenges than merely beating the computer players most of the time. You will soon discover that human opponents are the most satisfying to compete against. *Empire Deluxe* is a computer game that is not solely confined to the shackles of solitary play. Instead, it can be played against up to five other human opponents.

This book not only will help you with the mechanics of connecting up with other players (in particular, where to find them in the first place), but also will prepare you for a new battlefield—the diplomatic one! While the programming of *Empire Deluxe* makes no provisions for formalized, enforceable diplomatic agreements (and its opposite, ruthless treachery), much can be done informally. While we cannot prepare you with a knife-proof back, we will help navigate neophytes through the delightfully treacherous seas of interplayer diplomacy in *Empire Deluxe*.

DESIGN PHILOSOPHY

Where this book should bring a new twist to strategy-game guides is in its incorporation of the designers' thoughts and philosophies throughout its pages. Many people will ask why things are the way they are in *Empire Deluxe*. Well, we have tried to present what was in the heads of Mark Baldwin and Bob Rakosky as they put this game together. Hopefully, you will find their comments illuminating.

This book, thus, takes on a new dimension as something of a primer for "wannabee" strategy-game designers. Frankly, there may be no better game for them to learn from by way of example than *Empire Deluxe*, due to its elegant game systems and proven, classic play value. Fortunately for all, Mark and Bob are both eloquent spokesmen of their design philosophy and have shared much of it in this tome.

The designers' quotes sprinkled about this book have been taken both from repeated personal conversations and their numerous bulletin-board messages posted regularly on the GEnie, CompuServe, and Prodigy networks. As the game was being developed, many people (the authors of this book included) who had long enjoyed the original *Empire* were asking questions about what sorts of things would be in *Empire Deluxe*. The answers they got back were always fascinating because Mark and Bob would throw in a bit of their design philosophy with each one. We hope you like our inclusion in this book of their extra insight.

As an added bonus, we've even created a section in the final chapter just for additional designer's quotations. There, we've broken down Mark and Bob's comments by subject. For those who want more nitty gritty design philosophy, two appendices include Mark and Bob's papers on the subjects of artificial intelligence and play-by-modem gaming. This book should be a quite a treat for future computer game designers.

TO BATTLE!

But enough prattle. Now that you know where we're going, let's get started. Every great journey begins with a single step and, when you turn the page, you'll find the first step is to jump right into the first tutorial scenario.

Taking Command: The First Tutorial Scenario

The tutorial scenarios provided with this book have been engineered to ease new players into the world of *Empire Deluxe*. Each tutorial is easily accomplished, one carefully explained step at a time. The gist of every step is shown at its numbered beginning, for ease of reference. This chapter deals with learning the Basic Game rules and mechanics. Chapter 3 graduates players to the Standard Game, while Chapter 4 completes their training with the Advanced Game.

If you follow these tutorial chapters in succession, applying the lessons learned from each one to the next, the greater challenges of the Advanced Game will beckon you further into this book. We have tested these scenarios on both novices and experienced players and have crafted them to be instructive for players of every skill level.

Every reader should play each of these scenarios at least once. It is all right to repeat a tutorial scenario as often as necessary until you feel completely comfortable with it. This is not a race—play at your own speed. Keep in mind that our ultimate goal is not merely to make you an Advanced Game player—but to make you an *expert* Advanced Game player!

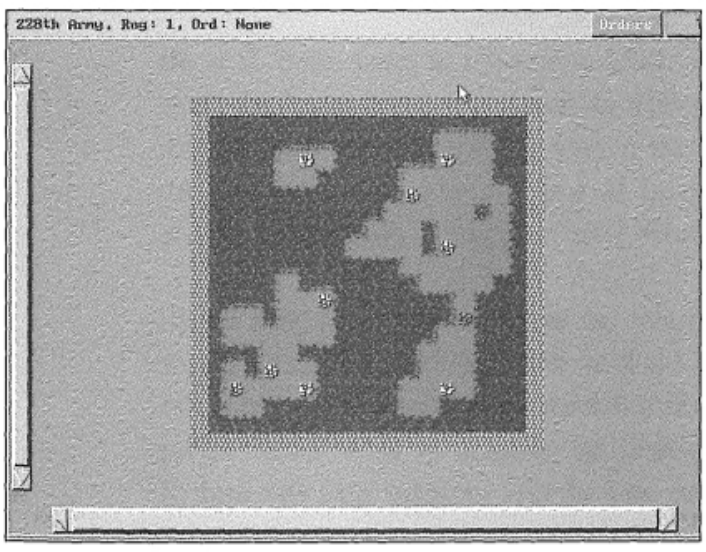
We are confident that this will have occurred by the time you finish Chapter 11. That chapter brings you back to the final tutorial scenario for another playing session—this time armed with more knowledge from the previous chapters. We're sure that you'll be amazed at how much better you play *Empire Deluxe* between the end of this chapter and the end of Chapter 11.

A Note to Experienced Players:

The tutorial scenarios and the situations they present are often referred to in other chapters of this book. They are used as a basis of common player knowledge to illustrate key points in the text. Experienced players, therefore, may want to play through the scenarios quickly so that the references will make sense to them.

Also, to lessen distractions during the tutorial learning experience, the Army Production Reports, Unit Orders music, and Battles/Movement sound effects have been switched off. Experienced players who want to can manually switch them back on through the Display/User Prefs. menu [Alt][U].

BEGINNING BASIC GAME TUTORIAL



1. Load *Empire Deluxe*.
2. From the Main menu, select Play Game.

In *Empire Deluxe*, things can be selected by either clicking on them with the mouse cursor, by scrolling through them using the arrow keys, or by selecting the keystroke that matches the single blue letter contained in the word of the on-screen button you want to press. Experiment throughout these tutorials with each of these different methods of doing things.

3. From the Game Start Options menu, choose the Standard Rules.

Don't panic and select the Basic Rules—trust us. Our first tutorial is not an *official* Basic Game (the game mandates a 50 x 50 randomly generated map for those). Instead, we've created a special, miniature 20 x 20 map scenario and picked out the starting cities for you and your computer adversary. Smaller map scenarios greatly reduce playing time and, thus, will help make your first tutorial a quick and enjoyable learning experience.

4. From the World Options menu, select Load Game Scenario.

This will bring up a Selection menu of scenarios available to play.

5. Select BOOKTUT1.SCN from the list and read the Scenario Values screen.

You will notice as you read the Scenario Values screen which pieces will (and will not) be available for play in this tutorial scenario. This time, only infantry armies, transports, destroyers, cruisers, and battleships are available.

6. Press the OK button to leave this screen.

7. On the Player Setup screen that follows, select the bar for Player 2's information by clicking on the gray area that reads Person–Local (or press [2] and then [P]).

This will pop up a menu where you can select your opponent type. Since you are not playing a "local" human opponent (one who will

be playing on the same computer), you must adjust Player 2's status to that of a computer opponent.

8. Select Computer–Easy for your first time out, then press OK.

Don't worry about setting any handicaps at this time. We'll teach you about those, the various player-difficulty levels, and changing your player color in future chapters.

9. Finally, type in your name (or a suitable *nom de guerre*, such as The Drek Squad or Mighty Mite) and press OK.

Congratulations, you're ready to play!

The Initial Decision

Your first decision is what your pregame production will be for your initial city. Your choices include armies, transports, destroyers, cruisers, and battleships (submarines, airplanes, and aircraft carriers will be dimmed out because they are not available for selection in this tutorial). Before we tell you what to select, here are a few words about the different unit types:

Armies are the name of the game. *Empire Deluxe* is, primarily, a game of conquering cities. Only army (land) units can capture a city. Therefore, think of armies as the starring unit type in *Empire Deluxe* with all the other pieces as the supporting cast (with their primary role being to help or hinder friendly and enemy armies in taking their primary objective—cities).

Transports are the second most important unit type after armies. Armies can only cross ocean squares while on transports, so to get your troops from one landmass to the next requires loading them aboard transports first. Each undamaged transport can carry up to six armies at a time. Transports, however, have little fighting ability and are extremely vulnerable when attacked.

The remaining unit types available (destroyers, cruisers, and battleships) are used to sink the enemy's transports and protect friendly ones. In this manner, they can control the overseas movement of armies.

Destroyers are the weakest of the surface naval combat units—although they are fast, moving three spaces per turn. Destroyers can usually outfight a transport. They are followed in strength by cruisers, with battleships being the strongest of the three surface naval combat unit types. Cruisers and battleships can, additionally, bombard land units next to them on (noncity) coastal squares, usually destroying them with ease.

Armed with this knowledge of the unit types, you are ready to select your initial production strategy. Since you are beginning on a continent with other cities to conquer (the unowned, white *neutral* ones), your initial production strategy should be to build armies. Once armies begin to appear, move them to the neutral cities on the continent and conquer them. After securing your continent, you must prepare to invade others.

10. Select Armies to build, then press OK.

11. When asked if your turn is completed, select Yes. This screen, rarely seen once play begins, is explained in Chapter 6.

12. Six turns will suddenly race by on the turn

counter at the top-right corner of the screen. Before doing anything with your newly built army, however, read on a little further.

THE LAY OF THE LAND

In this scenario, there are only three types of terrain on the map. They are land (also called clear or plain terrain), cities, and ocean. The object of every game of *Empire Deluxe* is to wipe every enemy unit off the map, while capturing as many cities as possible in the process.

You never need to conquer all of the neutral cities, but they are there for the taking, and their production will greatly aid you in achieving your ultimate goal of sole survivorship. Sometimes, enemies will offer to surrender when they know they are beaten, but before they are completely destroyed (as explained in Chapter 8). It is up to you whether to accept such surrenders or not.

In terms of terrain, armies are the units that move on the land and into cities. Ships, of course, move along the oceans, but can also enter friendly controlled port cities (ones next to an ocean square) just as land units do. Ships cannot capture these port cities, however—that is a task reserved exclusively for land units. Ships and land units interact (i.e., fire at each other, embark, and disembark) at cities and along coastal squares.

13. Press OK to close the Production box (you're going to continue building armies), and notice that your new army is blinking eagerly. When a unit is blinking, that means that it awaits your command. Presently, your blinking army is located on your starting city. To find out a city's name quickly, click on it once with the right mouse button. Notice that its name appears in the Information bar. Go ahead and check out all of the city names in this manner.

14. Another, more important way to discover information is to double-click the left mouse button on a city. This pops up a display giving the city's name, its grid coordinates (don't worry about those for now), who owns it, and what it is producing. *By checking out enemy cities in this manner, you are actually spying on them!* Quickly examine a few cities by double-clicking on them with the left mouse button.

Now you are ready to march your new army off to conquer the nearest city—toward the top of the map, located next to the lake. (We'll call the top of the map the "north" throughout this book, although there is no real compass in *Empire Deluxe*.) As you discovered in the previous two steps, that city is named BUILD NO SHIPS HERE (its name being a hint for you).

Getting There Is Half the Fun (Part 1)

There are two (and sometimes even three) ways to do just about anything in *Empire Deluxe*. The game was designed to allow for virtually complete control through either keyboard or mouse commands. Remember, as you experiment with these tutorials, to try each of the different ways of doing everything, and find the one that works best for you. Many players primarily use the mouse with occasional keyboard input to do a few, selected quick access (hot-key) functions. That will probably work best for you, too.

The first way to move pieces in *Empire Deluxe* that we will teach you affords you pinpoint precision. That method is to use the numeric keypad on the keyboard. (It doesn't matter if the [Num Lock] key is on or off, by the way.) Simply imagine that the blinking unit is sitting on the [5] key and that hitting any of the surrounding numbered keys will move the unit one square in that direction.

15. Press [8] and move your new army one space north.

16. Next turn, press [7] and move it one space diagonally to the northwest.

Note that pieces *can* move diagonally in *Empire Deluxe* without penalty.

17. Keep marching your army toward the city of BUILD NO SHIPS HERE via the keyboard until your army is next to the city.

TO BATTLE!

To attack a city (or an enemy unit, for that matter), simply order the unit to move into the target's square and watch the result of the ensuing battle. When attacking a city, an army has a 50/50 chance of capturing it. This is also the same chance it has when attacking enemy armies. No city or army is tougher than any other, although a string of defeats when attacking (through bad luck) might make it appear so.

18. Go for it. Give your army the order to move into the city and watch the battle's outcome.

19a. If you are victorious, another Production menu pops up right away and asks what you should begin producing there. Select armies again.

While you could build ships here, they would only be able to maneuver inside the two-square lake next to the city, which is not very useful. This is the reason we named this city BUILD NO SHIPS HERE.

19b. If you are defeated, you must persevere. Keep sending army after army against BUILD NO SHIPS HERE until it falls.

Don't be discouraged. With an even chance on every attack, eventually the odds will break your way and you'll capture the city. (After all, how many coin tosses in a row can you lose?)

20. During this time, you'll notice the green-colored enemy busy conquering his island in the lower-left corner of the screen. There is little that you can do about this right now, except to hope that his luck is bad and he loses many armies trying to capture all four of the cities there.

One important thing that you can do, however, is to spy on his cities. Do you remember how to do that? Either double-click the left mouse button or single click the right mouse button on the green cities from time to time and see what they're producing. When you see him building ships, that means that the game is going to get interesting very soon since you will both be trying to project sea power and, thus, fighting naval battles in the channel between your two respective islands.

Remember, some ships (particularly battleships) take a long time to produce. If you can capture the cities producing these ships before they are completed, the enemy will have completely wasted his efforts there.

Getting There Is Half the Fun (Part 2)

Whether you won or lost your initial battle, other armies will soon be built to continue the fight. You are now ready to try a slick, new method for moving these new armies toward their destinations.

21. If you won your first battle, move your next army to the southernmost city of the island, South Pointe. If you lost the battle, keep marching against your first objective (BUILD NO SHIPS HERE) until you capture it.

The way your army will get there this time,

however, is a little easier. You can automate troop movements using a mouse by clicking on the unit's desired destination with the left mouse button. This is known as the quick-click movement technique, and it will send your unit one move closer to the destination you clicked on. On the next turn, it will ask for new orders again.

By holding down the left mouse button for a full second, a Move To movement order is issued. You'll know when this is happening because a line will appear between the unit and the destination you're selecting. This line can be dragged around the screen while the left mouse button is held down. When you let go of the left mouse button, the destination is set and the army unit will move on its own, turn after turn, until it either arrives there or is interrupted by being attacked en route. This is the long-click Move-To technique.

22. Also try the alternative method for issuing the Move To order, via the Menu bar.

To access the Menu bar, move the mouse pointer up to the gray Information bar along the top of the screen and single-click the right mouse button or, alternately, simply press Alt

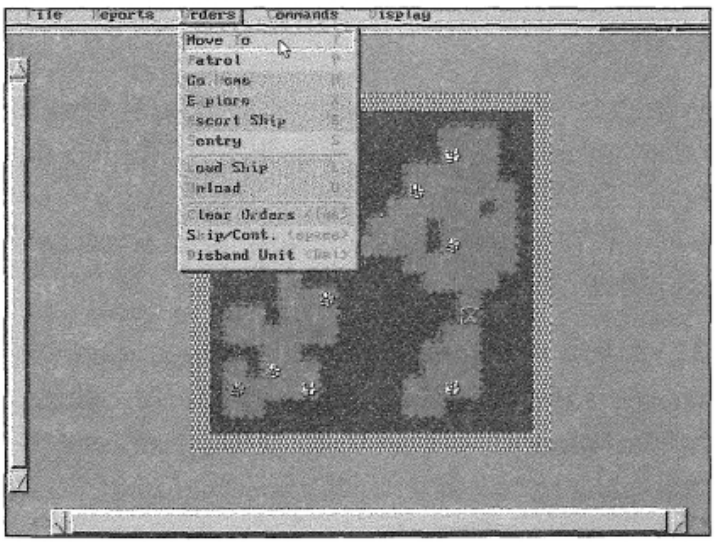


Figure 2.1 Selecting Move To from the Menu bar

(regardless of the mouse pointer's location). The Information bar will instantly turn into the Menu bar. From this Menu bar select Orders, and from that menu select Move To.

23. (*Optional*) While you're practicing access to the Menu bar, you may want to peek at some other menu items, too. Each appears with its keystroke equivalent in blue lettering to the right of each command.

Note that using the Move-To command from the Menu bar or hitting T has the same effect. When the Move-To command is set up, a box of moving dashes appears around the unit. Using the mouse pointer, click on the box and drag the dashed line to the army's objective square. Via keyboard, just press the right sequence of numbers to move the line to the army's objective. Note that the range (distance in squares to the destination) is shown on the Information bar. Once the objective square has been reached using the mouse or numeric keypad, select it by clicking the left mouse button (or hitting Enter), and then sit back.

On each turn, your army will relentlessly march toward its objective without further prompting from you. Armies under this type of movement order will not make attacks, neither against a city you may have marched them to, nor against any enemy units they might encounter along the way.

24. Once your army reaches the square next to the target city, nudge your army into combat. To do that, click once with the left mouse button on the city square itself, and a battle for that city will result.

25. When BUILD NO SHIPS HERE is finally secured and South Pointe has also fallen, build a transport in South Pointe.

Once built, that transport will make you ready for your final lesson of this first tutorial.

AMPHIBIOUS OPERATIONS

26. It is our strategy to use the armies raised in BUILD NO SHIPS HERE to finish conquering the remainder of the island. The armies pouring out from RED STARTING CITY will conquer SOUTH POINTE and then wait there to board the transport that SOUTH POINTE is building. In this manner, you're expanding in two directions at once.

27. Build a destroyer in PORT SKULKER and a cruiser in NEW ST. EMRICH (named after a famous author's wife—he-he-he) when they are conquered.

Strategy Note: *Empire Deluxe* is, generally, a game of combined arms operations. This means having a variety of unit types available in your arsenal, each to do a specialized task. By building a combination of armies, transports, and ships of various sizes, it is more likely that you will have the right kind of units available when you need them (and *where* you need them). That, in turn, will help you win battles and campaigns. Combat interactions between the various unit types are explained more fully in Chapter 9.

Although we have told you *what* to do in terms of early conquest in this tutorial, we will not be delving any more deeply as to *why* you are attacking cities in this particular order or having them produce the units we've specified. By the time you finish the tutorial recap performed in Chapter 11, the answers to these and all of the other "whys" you are probably asking will have become apparent. Have patience.

28. Armies raised in BUILD NO SHIPS HERE after PORT SKULKER and NEW ST. EMRICH have been secured should be marched down to Port Skulker and await the construction of transports.

Remember to experiment by moving your pieces around using keyboard and mouse by turns until you find the method that suits you best.

29. Put your armies in sentry mode as they arrive in SOUTH POINTE. Do this when their turn comes up (i.e., when they are blinking) after they arrive in SOUTH POINTE by pressing [S] or by selecting Orders from the Menu bar and then selecting Sentry.

A unit in sentry mode is *asleep*. It does not blink any more, asking for a chance to move every turn. It will wake up only when an enemy unit moves next to it or when the sentry order is cleared—this is done by double-clicking the left mouse button on its square and, from the pop-up window that emerges, selecting the unit, its Orders button, and then, finally, issuing the Clear Orders command. *If you accidentally "sentry" the wrong unit or want to wake up some of your sleeping units, that is what you must do.*

The units that are on sentry duty in SOUTH POINTE will automatically hop aboard the first transport that gets built there. A transport moves two spaces per turn and (if undamaged) can carry up to six armies at a time. Land units can be loaded aboard transports along coastal squares also by simply moving the land units into the transport's square. This move won't be allowed if the transport is already full, however.

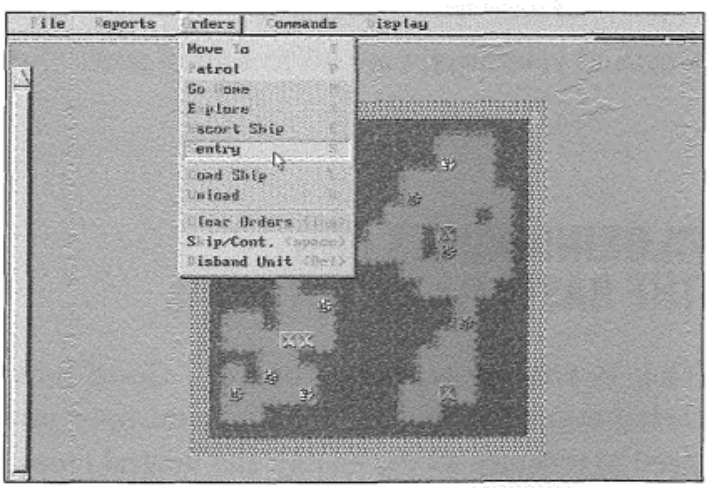


Figure 2.2 A first look at the game menus

30. Send your first transport over to a nearby enemy city and get ready to invade it. This should be either OLD YORK or the CAPE OF GOOD FEAR.

Double-click on both cities to see what they're building and invade whichever one appears to be the most threatening. In this scenario, consider any port building ships a threat—the bigger the ship being built, the bigger the threat. Just be sure not to be too close when ships under construction are ready to pop out, or they will sink your weak little transport!

31. When the transport finally moves next to the city you decided to invade, the armies on board will automatically wake up and be ready to attack it (if the transport is still blinking when next to the enemy city while armies are on board it, press Spacebar to end the transport's move for the time being).

32. If you capture the enemy city, start building armies there, too. This will make your conquest of the island easier.

33. If there are still armies aboard your transport, sail it into your newly conquered, formerly enemy city. The remaining armies still asleep on the transport will automatically awaken and be ready to continue the attack on the enemy's island by marching overland from that newly conquered port. The invasion is now truly underway, and your armies are off to a good start!

CLOSING NOTES FOR THE BASIC GAME TUTORIAL

That is enough learning for now. Good luck dominating the world! To win, you may not need to conquer all the enemy and neutral cities, since your adversary may resign when he knows he's beaten. If you win, you may also get your first promotion (player "ranks" are explained in Chapter 8).

Meanwhile, experiment around with your fleet and try some naval combat. Don't worry too much about the proper use of sea power or even winning the war. The following list of things to try while you play this first tutorial scenario might come in useful during play:

- Once built, send your destroyer to sink the green player's transport. Try to avoid his armies on beaches or hidden in ports, or they will attack your destroyer. If your own transport is destroyed, remember that SOUTH POINTE is constantly building new ones.
- Once built, send your cruisers and battleships along the enemy's coastline and shore bombard his armies on coastal squares next to your ships. Naturally, these ships are also good for beating up on enemy destroyers and transports.
- Similarly, if your armies are next to enemy ships, you might want to either attack them (this is usually a losing proposition for the army, but it can damage and even sink ships) or avoid having your armies bombarded by moving them away (inland) or ducking into a friendly coastal city. Ships cannot bombard port cities.
- If the computer player builds battleships, you may have to build some, too. This can create something of a naval arms race (just like pre–World War I Europe), and you won't want to fall too far behind.
- **Important hint:** If you find that your armies have a choice of targets and one of them is an enemy city, *attack the enemy city*. The reason is that, if you conquer it, you will certainly screw up the enemy's production strategy. Furthermore, the enemy's nearby armies might just as easily die when they counterattack your newly won city.

- If your continent is invaded, send armies (possibly on transports) to take your cities back. This may require switching production of some of your ship-building cities to armies if the enemy invasion is not quickly and easily defeated with the forces you have on hand.
- If the enemy's fighting-ship types (destroyers, cruisers, and battleships) try to attack your transport while it is waiting in SOUTH POINTE, you might try to flee *eastward* to RED STARTING CITY. Go around the east coast of your continent, sail in from the east, and then exit again from the west (using the city as a canal). Since ships cannot move through cities they don't own, your transport can safely make its escape while leaving its pursuers stuck along your east coast.
- There is more than one way to get your armies off a transport. Here are a couple of other methods for disembarking your troops along desired beaches rather than invading cities directly:

The first method is to select the Unload command from the Orders section of the Menu bar during the transport's move. That will wake up the land units on board until every land space next to the transport is occupied by friendly armies. Alternately, you can wake up individual units aboard the transport by double-clicking with the left mouse button, selecting which unit you wish to wake up, and clearing its orders.

Remember, you should feel comfortable with all of the lessons in this chapter before moving on to Chapter 3 and the Standard Game. Take your time, practice some of the techniques you were taught at the end of this chapter, and, when you're ready for more, turn the page.

Rising Through the Ranks: The Second Tutorial Scenario

Once you feel you have mastered the Basic Game tutorial scenario after playing it a time or two, you should be ready to move on to the Standard Game tutorial. This tutorial is, essentially, a compressed version of the old *Empire* game. As you'll read in Appendix A, it is a game that many people have been playing for a long, long time. Now you'll see what all the excitement was about.

BEGINNING THE STANDARD GAME TUTORIAL

1. To load the Standard Game tutorial, select Play Game from the Main (Game Options) menu.

2. Select Standard Rules from the Game Start Options menu.

3. Choose Load Game Scenario from the World Options menu.

4. Choose BOOKTUT2.SCN this time.

5. Just as last time, make Player 2 a "Computer–Easy" opponent (although, if you feel confident, you can set your opponent's skill level to "Computer–Std.").

6. Select OK, begin the game, and be prepared to make your first production decision. However, we should first introduce you to a few new twists.

New Worlds to Explore

No doubt you will notice that the world, save for your starting city and the eight squares surrounding it, is completely blacked out. That's right, the world is undiscovered. Your first task, therefore, will be to explore it.

Hence, our initial production strategy will be a sound one: build a fighter first, and use it to quickly explore the map. A discussion of initial production strategies is included in Chapter 10 (and our personal strategies are outlined in Chapter 16).

As pieces move around, they reveal whatever terrain is under the artificial blackness in every square they come next to. In the next tutorial (the Advanced Game), some pieces can see two spaces away instead of just one.

7. So, go ahead and select a fighter for your initial production.

8. Then press OK when asked if your turn is done.

9. In a moment, the Production Report menu appears as shown in Figure 3.1. When it does, *do not press 'OK'!* Instead, select Prod. and change your production to Army units.

Remember, armies are the name of the game. Only they can conquer the cities you'll need to build the units that will allow you to win the game. Building one airplane for early exploration is enough. After that, you will need land units to conquer the cities they discover.

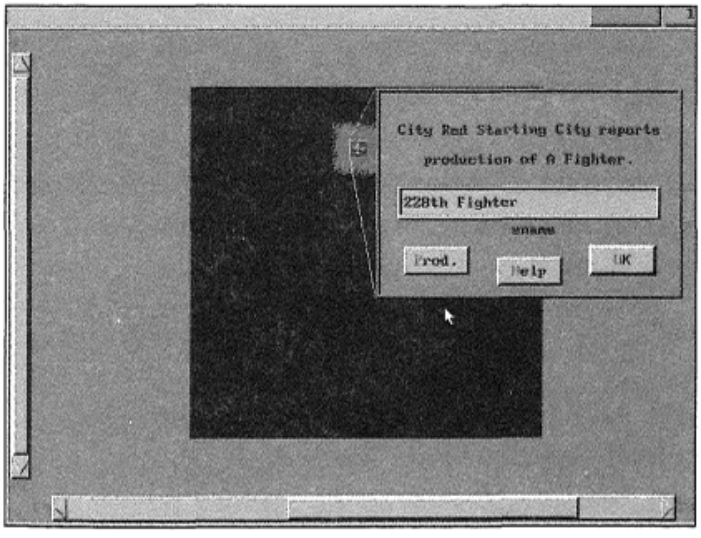


Figure 3.1 Your first fighter's Production Report

10. Once your airplane begins to blink, read the text in the Information bar along the top of the screen. It will give the fighter's name and, most important of all, its range (along with its current orders, which as yet are none). It is time to learn about this new unit type.

Airplanes are unique in that they move several spaces per turn but have only a limited endurance (which, if exceeded, causes them to crash and die). This endurance limit is the fighter's range.

In this, the Standard Game, a fighter's range is 5/20. This means that it can move five spaces per turn and twenty spaces total before it needs to refuel (land) at either a friendly city or on an aircraft carrier. Skipping its turn in midair (by pressing Spacebar) will not save any of the airplane's fuel. It is still considered in the air for the whole turn and spends its five moves flying around in that square.

After landing, an airplane's endurance instantly rises back to twenty at the start of the next turn. Thus, Standard Game fighters have four turns' worth of flight endurance. In other words, you can fly them two turns out and two turns back.

Now it's time to move your fighter around the map and do some exploring. We strongly suggest using pinpoint precision movement when exploring the map. This means either using the numeric keypad or clicking the mouse in squares next to an exploring unit. The reason for using precision movement when exploring is that we have a good habit to teach you right from the start: zigzagging.

11. Using the numeric keypad to move your first fighter, explore to the south (since you're starting near the north edge of the map , it's more likely that you'll find what you seek—in particular, the enemy—to the south) by pressing, alternately, 1 and 3 five times each (thus, zigzagging a wide swath due south).

By the time turn 15 begins (time will move very quickly since no enemy is visible yet and one turn will instantly blend into another), you'll notice that your fighter's range now reads 5/10 and the warning "SHORT ON FUEL!" appears in blue lettering on the Information bar. Heed this warning whenever you see it and know that it is time to get that air unit back home.

12. Along the way back, further exploration can also be done (there is no sense wasting an opportunity to gain a little more information). Try pressing [9] on the numeric keypad five times followed by [7] five times.

This should get your fighter safely home, as shown in Figure 3.2, and, on turn 17, it will be ready to begin with a fresh tank of gas. Thus, it can move a full twenty spaces again, beginning on the next turn.

13. Stop for a moment and take a quick survey of your map discoveries at this point. Go ahead and spy by double-clicking the left mouse button on cities to find out their information.

You will find there are three neutral port cities on your continent. They are named, appropriately, CONQUER ME FIRST, CONQUER ME NEXT, and I'M LAST. (Hey, we're just trying to help you here!) Not surprisingly, this is where your armies should be heading and in what order these cities should be attacked. (Alternative conquering strategies will be discussed in Chapter 11.)

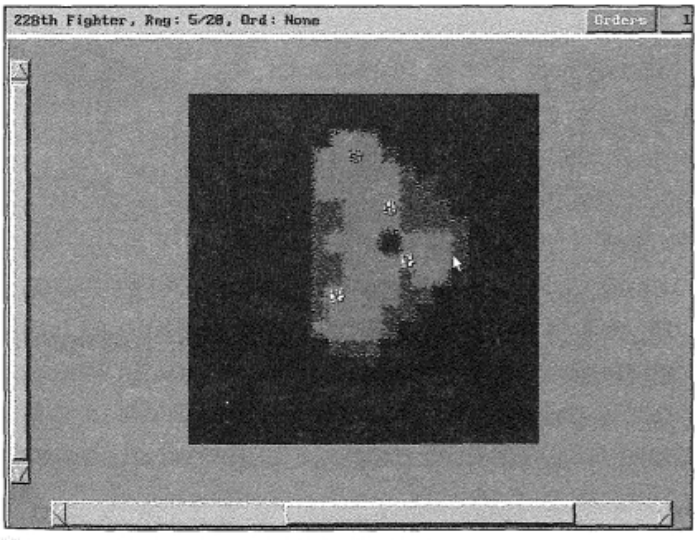


Figure 3.2 The map of Tutorial Scenario 2 at the beginning of turn 17

We're Wrapping Now

14a. Continue another voyage of exploration with your fighter on turn 17, only this time, press [1] ten times in a row to check the furthest corner of exploration you can to the southwest of Red Starting City.

At the end of this leg out, you will see the map move slightly to the right as it "wraps" from east to west (the map in this tutorial has no left and right edges—instead, it rolls laterally like a cylinder). On the last move your fighter will be next to the town of GREEN STARTING CITY.

14b. *Note:* Hope that your enemy's fighter doesn't shoot yours down while you're hanging around out there. If it does, you will want to restart the game as per step 1 and repeat it up to step 15 until your fighter survives.

15. You must now move your fighter back home (did you notice the "SHORT ON FUEL!" warning again?). This time, you will try something new. Use the Go Home command from the Menu bar (or press [H], the keyboard equivalent), and watch what happens.

You'll notice your fighter streaking back across the map edge, wrapping the map again from east to west, and creating a huge path of discovered squares in its wake. Pretty neat, eh?

16. As shown in Figure 3.3, on turn 19 your first army will roll off the assembly line. Use it and subsequently produced armies to conquer

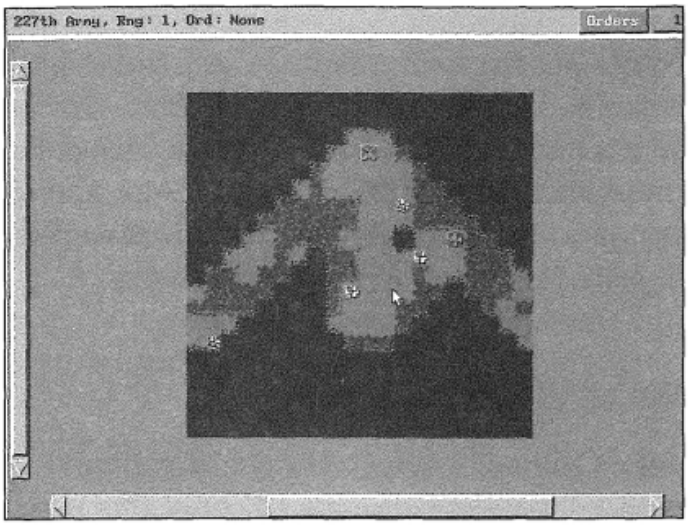


Figure 3.3 The map of Tutorial Scenario 2 at the beginning of turn 19

your continent. Remember to check the city names by spying on them, if you forget which order to conquer them in.

17. Be sure to build transports fairly soon, and keep building armies to put on board those transports. You also will want some ships and planes to support your amphibious operations during this game.

18. Use your airplane to continue to explore the map. Be sure to base it at newly conquered cities to extend its operating radius further.

If you lose your fighter, build its replacement sooner, rather than later, so that you can keep exploring easily. It really helps to know where you are going!

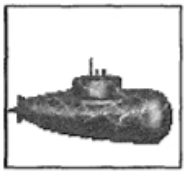
NEW UNITS IN THE STANDARD GAME

Before you send your armies off conquering your continent (and then the enemy's), you will want to know about the new unit types you can build in conquered cities. The units from the first scenario have remained and still maintain their usefulness throughout this and the final tutorial scenario. However, allow us to present the new units and Standard Game rules for them prior to your playing out this scenario.

Although they were available in the last tutorial scenario, we didn't have much to say about battleships. We still don't. Just be aware that these behemoths are primarily overgrown cruisers that can take and inflict a lot of hits.

In combat, fighters (which you've already had some experience with) attack enemy armies and fighters with a 50/50 chance of killing them (or being killed) in the attack. Their chances are smaller against ships, only because ships can sustain multiple hits to a fighter's one. A particular strength of fighters is their high movement rate per turn. Since each square moved into might be a victorious battle site, theoretically a fighter in the Standard Game can kill five enemy units in a single turn. Of course, the odds of finding the enemy that densely packed and winning five battles in a row are pretty low—but it *could* happen!

One interesting new unit added in the Standard Game is the submarine. These hunters of the deep are extremely effective when attacking (although they are very vulnerable when defending). They are difficult to spot (except for a unit accidentally stumbling directly into a submarine's square, only destroyers and cruisers can spot adjacent submarines). Submarines are cheap and deep (though hard to keep) and are occasionally worth building. Be careful when the computer player starts to use them against you!



Aircraft carriers won't have much use in this scenario since their primary function is to pro-

ject fighters (for both their exploration and combat support roles) to far away places. Since this scenario's map is so small, finding bases for your fighters at cities is very easy to do. Consequently, aircraft carriers are superfluous in this tutorial scenario. (However, you *will* need them in the next tutorial scenario, we promise!)

PRESSING ON

19. Conquer your continent, and have your cities build a variety of unit types. Make sure that at least one city is always building transports and another is always building armies to load onto them.

Remember what we said in the previous tutorial about combined arms operations being the best for winning battles and campaigns. Again, we'll elaborate on the reasons for this in Chapter 9, but here is a brief example: When you invade the enemy island, it is good to have some cruisers and battleships nearby. They can lend shore bombardment support and, together with airplanes, can clear away counterattacking enemy land units before they throw you off the beaches.

Experiment, for now, finding useful combinations when using all of these tools in your toolbox. We'll show you the real tricks of the trade when you reach Chapter 9.

Tracking the Enemy

As you play out the Standard Game tutorial and prepare your attack on the enemy's position, you'll notice that his units will appear and disappear. This is not a bug in the program. Instead, it is a deliberate design element to provide players with only limited intelligence. Here is how it works: When an enemy unit is first sighted, it appears normally (as it did at all times during the previous tutorial). Unless the unit is spotted again on the next turn, that sighting location will remain marked on the map, but the unit's image will acquire a black background to remind you that it is an "old" sighting report and the unit has probably (although *not necessarily*) moved away.

Old sighting reports will serve to remind you which enemy pieces have been recently sighted, and where. Thus, they are probably still lurking nearby. After three turns, old sighting reports will simply disappear from the map. By then, who knows where the enemy may have gone off to?

An Economic Note

When playing under the Standard or Advanced Game rules, if a city continues to produce a given unit type after having just built one of that type, it saves one turn in six from the time required to build subsequent units. Thus, if a city built an army (which takes six turns) and continued to produce them, armies after the first one is built will each take only five turns to produce. Details of (and exceptions to) this economic model are presented in Chapter 10. For now, it suffices to say that leaving a city to produce one unit type repeatedly will, in the long term, give you more of those units.

CLOSING NOTES FOR THE STANDARD GAME TUTORIAL

20. By now you've probably got plenty of ideas of your own to experiment with for future forays into world domination. We're past the point of telling you what to do in reaction to specific situ-

ations on the map. Just as the driving instructor is no longer there to help you along every street the day you get your license, so we will leave you to discover the various avenues of attack and defense in this *Empire Deluxe* scenario. You now have your License to Conquer while your Expert Degree awaits you at the end of Chapter 11.

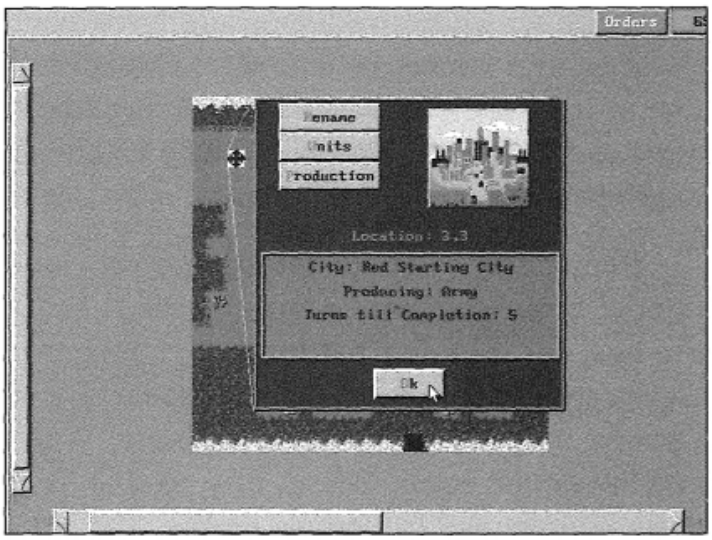
From here on, you must develop your own plans and sharpen your instincts. Experience is the best teacher for learning how to deal with the enemy's plans while successfully carrying out your own. However, while you're busy pushing the pieces around during play of this tutorial scenario, here are some special things to try that will help prepare you for your next and final lesson in *Empire Deluxe*:

- When ships suffer damage in battle, you should repair them. The damage information for friendly ships will be on the Information bar while the unit is blinking, or can be obtained by selecting the unit with a double-click of the left mouse button. (You can't get damage reports on enemy ships.)

  To repair a ship, send it to a friendly port city and have it sit there. For every full game-turn skipped by a damaged ship in port (either through the Menu bar; under Orders, Skip/Cont.; or by simply pressing [Spacebar]), one point of damage is repaired. Keeping ships up to full strength is the best way to go, since crippled ships have their chances of surviving combat and their cargo capacities greatly reduced (as detailed in Chapter 9).

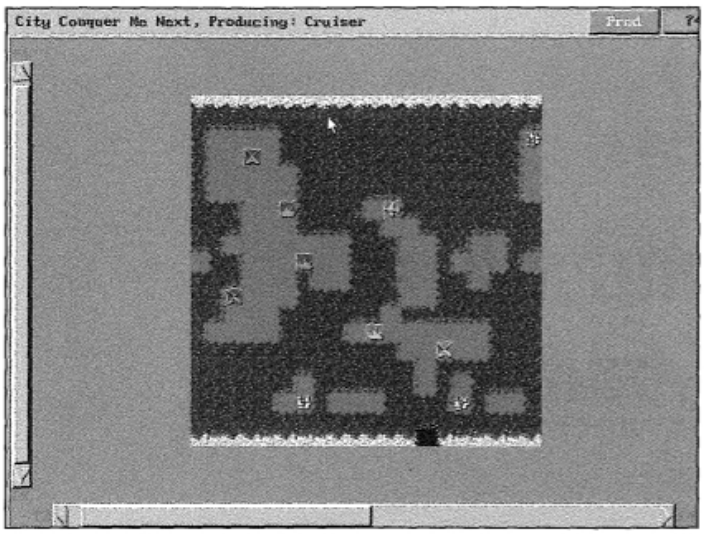
- On your second and subsequent games of this tutorial scenario, give your initial fighter the Auto Explore command (by either pressing [X] or selecting it from the Menu bar). This will keep that fighter exploring blackened squares (with a fair degree of efficiency) automatically. Units with Auto Explore orders will continue on their own until either they can reach no more undiscovered squares, they move next to an enemy unit, or you manually clear their orders.

- It is always good to have access to information during play. To this end you will want to examine the Reports section of the Menu bar. Three of these reports are of particular use; the Status Display, Information Mode, and Production Map.



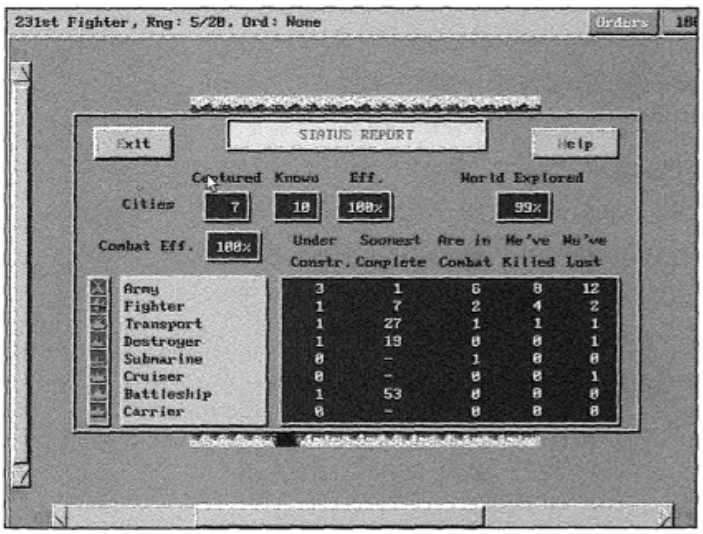
The Information mode has the same effect as double-clicking the left mouse button on a square. It calls up a window with all of the information available concerning that particular square. This will include its terrain type and map-grid coordinates, and may include unit- and city-information access buttons, if any units or cities are present in that square.

The Production Map changes the look and function of the game map. Instantly, all of the playing pieces are cleared away and each city is replaced by an icon of the unit type it is producing there (if any). Here, at a glance, you can take in the "big picture" of your overall economy—which units are being produced, in what quanti-



ties and where—and make changes to any city's production simply by selecting it. You'll read more about this feature in the Good Habits section at the end of this chapter.

Finally, the Status Report gives a plethora of information concerning your overall military position. This report explains your city situation,



in particular (i.e., how many you own out of how many you have discovered, and what your global production efficiency is—this could be less than 100 percent if you accepted a production handicap when setting up the scenario). The percentages for the amount of the world you've explored and your overall combat efficiency are also shown (again, efficiency could be less than 100 percent if you accepted a combat handicap during set-up).

This report is dominated, however, by a complete unit listing, which states how many of each unit type you are producing, when the soonest one of that type will be completed, how many of each unit type you presently have on the map, how many enemy units of each type you've destroyed, and how many of each unit type you've lost in combat (including those lost from attacking neutral cities and sunk as cargo aboard transports and aircraft carriers). This menu is good to ponder over from time to time and, by so doing, taking a mental step back from the game to formulate new production strategies.

Again, you learned a lot in this tutorial scenario. Still, the map was small and the action fairly quick and decisive. Make sure you are comfortable with everything presented in this chapter—particularly using airplanes and how to discover blackened squares—before you move on to Chapter 4. You will find the next (and final) tutorial scenario packed with a lot more fireworks. Brace yourself before turning the page—a new game called *Empire Deluxe* is about to dawn before you!

Advanced Training: The Third Tutorial Scenario

When confident that you understand the workings of the Standard Game, you will be ready for this, the Advanced Game tutorial. Here you will find out what the "deluxe" in *Empire Deluxe* is all about. This, the last of your tutorial campaign, will take place on a much larger map (50 x 70 as opposed to the 20 x 20 maps of the previous tutorials). It also presents a far more challenging fight.

You should anticipate a game of several hundred turns in length. Your first contact with the enemy will probably not happen until around turn 100 or so. For this game, the map will *not* wrap, as it did in the previous scenario. Instead, it will have the safe corners that the first tutorial did (this was a deliberate design decision on the authors' part).

The main lesson of this tutorial is to use all of the pieces in the game and to use them *properly*. Only by using all of the pieces properly will you be able to master this scenario. Once that is accomplished, the rest of this book will be your oyster. For now, in this chapter we will wean you from screen shots of the game (shown in earlier chapters in figures and illustrations) and let you discover the map on your own.

Before getting into the hands-on aspects of playing this final tutorial scenario, it is important that we tell you about all the new things that await you in the Advanced Game of *Empire Deluxe*. So, take a break, maybe get away from your computer for a few minutes, and read on for a bit. After we bring you up to speed on these new features, we'll start the game.

NEW EXPLORING AND DISCOVERY RULES

Discovery has become easier in the Advanced Game. Air units, air bases, and cities now have a two-square sighting range (as opposed to just the

adjacent square). You will instantly notice that your starting city (named Heart of Herring) looks out over a two-square radius. Exploration becomes more important as the size of the map increases, so expect it to play a greater role in this scenario. You will probably want to use the Auto Explore function with great extravagance during this scenario.

ADDING TERRAIN FEATURES

New terrain features will become apparent as you discover your starting continent. Generally, land units have a better chance of winning a battle when they are *defending* in nonclear, noncity terrain types. The square occupied by an attacking unit has no bearing in any combat situation in *Empire Deluxe*. A complete look at these new terrain features can be found in the next chapter.

NEW UNITS IN THE ADVANCED GAME

While aircraft carriers were available in the Standard Game tutorial scenario, the map offered little use for them. This Advanced Game tutorial scenario has been specifically designed with a large and important ocean that requires the use of aircraft carriers for projecting fighters to far-away places. When you do get around to building them, undamaged aircraft carriers can hold up to eight fighters. No bombers can be based on aircraft carriers.

Aircraft carriers are pretty tough to sink because they can take a lot of damage. However, aircraft carriers do not attack other ships very well and, thus, should be protected by other units (especially in known hazardous waters); i.e., protect a carrier with its own fighters, any nearby land based air units, and additional escorting warships.

Armor units can greatly supplement your land forces (which, previously, consisted only of infantry armies). Armor units can move through two clear (plain) or city spaces per turn. However, it costs them all of their moves during a single turn to enter any other land terrain type except mountains, which armor units are completely prohibited from entering. This speed makes armor units ideal for quick thrusts on land, for both exploring and combat.

Armor units' two moves per turn also makes possible their performing two *attacks* in a single turn. Although armor units are only equal to infantry, fighters, and cities in combat ability, they can absorb *two* hits before they are destroyed. These other types of units are all destroyed after a single hit in combat (see Chapter 9 for a complete explanation of how battles work). This gives armor extra longevity on the battlefield and allows them to take a hit of damage and still be able to limp home for repairs. An undamaged armor unit that captures a city becomes an infantry unit on the next turn.

Finally, armor units have another element of "two" to them besides their movement and the number of hits they can take. Armor units count as two against an undamaged transport's six-unit carrying capacity (i.e., a transport can hold only three armor units, or one armor and four infantry units, or two armor and two infantry units maximum).

Bomber units are aircraft that only move four squares per turn. However, they have a wonderful, 24 square endurance! Thus, they can fly three turns (12 squares) out and three turns back or rebase up to 24 squares away. Although they fight poorly against fighters, bombers inflict *two* damage

points each time they score a hit on an enemy unit (where fighters, infantry, armor, and cities only inflict one damage point each when they hit—see Chapter 9 for combat details). Thus, bombers are particularly suited for wiping out armored units and for more rapidly reducing the number enemy ships.

Additionally, bombers are effective at bombing enemy cities. This can result in damaging the city's production capability, destroying the unit currently being produced, or destroying enemy units located inside it. Interestingly, any unit in a city that finds itself defending against a bombing attack will be destroyed after only a single hit (as explained in Chapter 9). The ability to reduce a city's production efficiency makes bombers particularly useful for waging economic warfare against an enemy (as explained in Chapter 10).

Fighters have changed a bit from the Standard Game. They now have increased speed, being able to move six squares per turn. Their range, however, has been reduced from 20 squares to 18. Thus, they now have a three-turn flight duration, and need to plan their return trip halfway through their second move. *Be extremely careful not to push them beyond their nine-square operating radius!* Finally, while not as effective as bombers, fighters, too, can bomb enemy cities in an attempt to halt their production and destroy units in them.

Air bases make powerful "spotters" and "observation posts" with their two-square sighting range and ability to base an unlimited number of airplanes. They are also useful as rear echelon "staging" areas for aircraft moving up to the front without the need to base them on aircraft carriers (which cannot hold bombers in any case).

Air bases are extremely vulnerable to attack, however. They die of a single hit and fight back like an infantry unit. Air bases are constructed by giving an infantry or armor unit an Unload command (either through the Menu bar or by pressing [U]) while they are on a clear-terrain square. You will be asked to confirm the construction of the air base because the unit that creates it is removed from the game in the conversion process.

THE ECONOMIC SUBGAME

The Advanced Game of *Empire Deluxe* has a straightforward economic model. It operates on two levels: the individual city level and the *overall* level. While this system is presented in great detail in Chapter 10, a brief examination of each of these two elements is in order here.

Each individual city now has a production efficiency rating that will range from 0–250 percent. A city with a production efficiency of 100 percent takes the same amount of time to build a unit as it does in the Standard Game. This includes the time savings for continued production of the same unit type.

Higher efficiency cities take less time (200-percent cities build in half the time of 100-percent cities) and lower efficiency cities take more time (50-percent cities take twice as long as 100-percent cities) to build units. Cities lose efficiency points when they are captured or bombed by bombers. They can regain them, slowly, on each turn that their production is set to No Production.

How the new economic model effects your *overall* economy is based entirely on the number of units you have on the map (including air bases) versus the number of cities that you own. A reduction in your overall production efficiency (as shown in the Status Report display) is

caused by having too few cities available to support too many units. Basically, the ratio is that one city can support, roughly, two units. Any support overload will cause a *global* reduction of your economy, and, thus, it affects every one of your cities in addition to whatever their individual production efficiencies might be.

LAUNCHING THE ADVANCED GAME TUTORIAL

Whew! There is a lot of great new stuff, isn't there? Well, you are only one victorious campaign away from being prepared for the great adventures that lie ahead in this book. Are you ready? Here goes:

1. Load the Advanced Game tutorial by selecting Play Game from the Game Options menu.

2. Select Advanced Rules from the Game Start Options menu.

3. Choose Load Game Scenario from the World Options menu.

4. Naturally, you want to select BOOKTUT3.SCN to play.

5. After reading the scenario values, press OK.

6. Make Player 2 a "Computer–Std." opponent (or, if you feel confident, go for a "Computer - Expert" player) and get ready for that all important first production decision. Press OK.

As the World Burns

7. To help you get some experience with the new unit types available in this game, begin by creating a bomber first. Switch production to armor units once the bomber is complete.

Note that building a bomber for your initial production, followed by a tank, is a reasonably sound production strategy. Initial production strategies are discussed at length in Chapter 10.

8. Use the bomber for exploration.

Go ahead and explore by hand until the first armor unit is produced, then switch the bomber over to Auto Explore (the keystroke is [X], remember) and let the computer take care of your exploration for a while. You will find Auto Explore to be an extremely useful command to use in this game. Make extravagant use of it. (Note that when there is nothing left for a given unit to auto-explore, it will blink normally during its turn and await new orders from you.)

You will quickly notice that you are near the southwest corner of the board with a large landmass ahead of you off to the north and east. That is where you want to head, then; to the northeast. In a "four-cornered" world (i.e., one in which the map does not wrap), controlling the center is a sure way to find the enemy and get a gauge of where his homeland might be. (Of course, knowing what's around the board edges never hurts, either.)

9. Spy on the nearby cities and check their city information with a double-click of the left mouse button.

See any juicy initial targets? Take special note of the production efficiency in the city of IVORY COAST (which is 95 percent), due north of your starting city, HEART OF HERRING.

10. Head your first tank unit off to the Ivory Coast, and keep attacking it until it falls.

Move there via the numeric keypad to get a feel for the difference between moving a tank over clear squares and terrain-filled squares—the clear squares are a much faster way to go and should be used whenever possible.

When the IVORY COAST does fall, the armor unit that captures it may be replaced by an infantry unit (this would be the "change" left since, after spending itself conquering the city, the armor unit was not damaged in the process). If this happens, count yourself lucky and carry on.

You will notice some interesting things on the production menu when that (or a subsequent) armor unit captures IVORY COAST. These are (a) its production efficiency has been reduced to 85 percent (the reduction occurring due to the city having just been conquered), and (b) transports are highlighted in blue lettering on the production menu. (Bet you wondered what that was when you spied on this city a few moments ago, didn't you?)

The blue lettering means that transports are the IVORY COAST's *production specialty* type and can be produced there faster than normal. You will find several various production specialties sprinkled throughout the cities in the Advanced Game (although not every city has one, as explained in Chapter 5). As a rule of thumb, you should try to take advantage of them because they'll produce units of their specialty type much faster then normal.

11. Therefore, you may be tempted to go ahead and get started producing transports in IVORY COAST (since you can never have enough transports). Don't. Because you have a large landmass to conquer, build infantry units for a while and capture some cities with them. Once you've got a steady supply of land units being produced with which to finish conquering your continent, switch the IVORY COAST over to building transports. (*Don't forget about it!*)

12. Your next conquest will be the nearby city of NO BUILD YET.

If you spy on it, you would be right to think about skipping this city and moving on to another, more production efficient one. Well, we have a lesson to teach you here, so trust us and go take NO BUILD YET like the bright, eager Empire Deluxe cadet that you are.

After capturing it, you will see that No Build Yet's production efficiency has dropped from 15 percent to a measly 13 percent (yech!). When the Production menu opens, set it to No Production and forget about this city until around turn 100. By that time, it will have built up its production efficiency (at the rate of one percentage point per turn) to something respectable and will be able to help you crank out the navy you will be needing at that time.

13. Go ahead and finish the "early game" of discovering and conquering the large continent that you are on and the nearby islands to the north.

While there are strategies for weighing which cities to conquer in preference to others, they will be explained in Chapter 10. Just be methodical and do your best to secure every neutral city you find as promptly and efficiently as possible.

To that end, you should build a good mix of unit types and be ready to explore the large ocean area in the center of the map and at the map edges. This will require some destroyers and at least one aircraft carrier with a healthy complement of fighters on board. Don't worry about getting all of the details right at this time. They will be explained, and this aspect of this tutorial is re-examined in Chapter 11. Instead, learn by using the trial-and-error method your first time through this scenario.

When you have built up your navy and positioned it in the center of the map (sometime near turns 80–120), the "middle game" will be starting. At that point, brace yourself and read the next section of this tutorial.

PLAYING THE "MIDDLE GAME"

During the middle game, you will discover a chain of small islands in the middle of a large ocean. These islands, placed like the stars in the Little Dipper constellation, are prime candidates for building air bases. Also, you will want to prepare some defenses for your home continent.

As you mop up your home continent, you will notice that there are few "forward" cities located along its eastern edge. To further the discovery range of your airplanes and allow them to set up defensive scouting patrols later on, you should create some air bases along your eastern seaboard. About four to six air bases, evenly spread out from south of OUTER PORT to north of JARVIK, should do the trick.

14. Create these air bases by moving a land unit (preferably infantry because they are cheaper) to the clear-terrain square where you want to have an air base, and give it the Unload command from the Menu bar (or press [U]). You will be asked to confirm your conversion of the unit to an air base. If confirmed, the unit disappears and is replaced by an air base that can hold an unlimited number of air units.

Note that building these air bases next to ocean squares extends their ability to spot and to project air power to its furthest limits. However, such coastal air bases (along with every plane currently based on them) will be subject to destruction from enemy ships conducting shore bombardment against them. Conservative players, therefore, may want to build them one square inland.

These eastern seaboard air bases will not reach far enough to launch an attack from them, however. Air bases further east are desirable, so the "dipper" islands are where you will look next to push forward your aerial frontiers. Here is how you can establish air bases there:

15. Bring a transport over to these small islands and have them unload a land unit (again, preferably infantry) on each one that you can. Use the Unload command from the Menu bar or press [U] during the transports' turn to move.

16. Convert the land units disembarked on these islands to air bases by ordering the land units to Unload on the clear-terrain squares where they are located.

These newly built air bases will not only give you forward air bases further to the east from which to continue your exploration (and staging areas that will allow your planes to more easily reach the other side of the map), but they also make excellent "coast watchers" (i.e., spotters) with their two-square sighting range. If any enemy ships (except those sneaky submarines) try to sail through this dipper archipelago, these air bases will alert you to their presence.

Defense of the Realm

Finally, you must give some thought to the defense of your home continent. The computer player will attempt to invade it (usually early in the middle game). In all probability, these invasions will be small enough for you to beat back without any great danger of losing your continent. How quickly and efficiently you do so, however, will have an effect on how long it takes you to switch to a full offensive, undisturbed by enemy moves against you.

Defense is best achieved by using two tools: setting up patrols to warn of any danger, and having sufficient *react forces* (or fire brigades) available nearby to counter it quickly (i.e., put out the fires). These are known in *Empire Deluxe* as the Two Pillars of Defense.

17. Patrols can be done by land, air, and sea units. These units will move back and forth con-

stantly within an area you specify, ever vigilant for nearby enemy activity. To set up a patrol for a friendly unit, simply select Patrol for their movement order from the Menu bar (or [P]) and then define its patrol route. The square that the unit begins in must be the starting and ending point of the patrol route, but up to three points elsewhere may be selected by moving the cursor there and selecting them.

Be careful not to have units patrolling over too great a distance, or their ability to keep an area under watch will be greatly reduced. Also, air units must have a refueling point (city, air base, or aircraft carrier) as their initial/ending point of a patrol route—which makes sense. For example, a fighter might fly six squares out, six squares across, and six squares back to its starting base as its patrol route.

Remember, the goal of setting up patrols is to have them interconnect so that the greatest area is under constant observation by the least (i.e., most efficient) number of units. Patrolling land and sea units along the beaches (preferably the fast tanks and destroyers) or airplanes deeper over the seas is a good way to set up an early warning screen—exactly what patrols are supposed to do!

18. Setting up reaction (or react) forces is a little easier. Generally, having enough strength nearby to quickly beat back a small invation force (of one to two transports plus one to two supporting ships) makes for a sufficient react force.

While these troops could always be better used in an offensive somewhere against the enemy (see Chapter 8 for the Principles of War), if you're concerned about the enemy threat, then sufficient forces must be left behind for your own security. When calculating how many forces to leave for domestic defense, be sure to factor in patrolling units in an area as part of its local strength!

Remember to keep your react forces centrally located in vulnerable areas. For example, to defend the dipper-island airfields, use a couple of destroyers or cruisers. Place them so that a single ship can cover either of two nearby air bases within a single turn.

If and when you are invaded, deal with it quickly. Hasten your fire brigades to put out the fires started by the enemy, and resecure the area. Here is where the Group Move order can come in handy. Use it to shift sentries and patrols to the threatened area for an immediate counterattack. Playing experience will teach you not to ignore and not to overreact to enemy invasions, but to meet them with only the proper forces necessary to repulse them.

The End of the Beginning

The middle game will end with your eventual discovery and slow exploration of the enemy's main continent. There probably will be some tentative air and naval engagements around the dipper islands, but no massive battles or invasions to speak of will occur at this point. It is in the planning and executing of these massive invasions that the "end game" begins (probably in the turn 130–170 range). When you've reached that point, read on and learn how to knock out the giant that your enemy has become.

PLAYING THE "END GAME"

Prepare for the end game by building up your forces.

19. Shift your economy so that at least two ports are cranking out transports. (You can never have enough of those, remember?)

20. Have your other ports working to enlarge your war fleets.

21. Set your inland cities so that they are cranking out massive amounts of land units (to conquer the enemy's continent with) and air units (that can quickly reinforce and then support the invasion).

22. Try to assemble a large portion of your navy (over 50 percent) in a single area along your own coast. This should include as many loaded transports as you can gather (be sure that they are carrying at least a few armor units on board), carriers (with fighter complements), and a supporting force of destroyers, cruisers, and battleships.

The port city of OUTER PORT seems to be a good assembly point. It offers an eastern-facing port and is easily reached over land by many of your cities. Try assembling your armada near it.

23. Lumber this invasion force *en masse* toward a single, small area of the enemy's home continent, and hit it for all you're worth!

24. Try to reinforce your beachhead quickly with air units. Note that you probably will want to build another air base on the enemy's continent to ease transferring airplanes over there.

25. Move out from your beachhead as quickly as possible. Try to capture enemy cities before the computer player can react.

Remember, this will require some detailed exploration inland from your beachhead so that your land units can move inland effectively. You need to march your armor and infantry as quickly as possible toward nearby enemy cities and capture them. You do not need to waste your land units' time exploring the enemy's homeland!

Note that it may take several of these large, D day–sized landings before establishing a permanent foothold on the other continent (large continents are always like that, whereas small islands are easier to overwhelm). Do not despair, no matter how often you are thrown off the beaches. Each time that happens, simply assemble a *bigger* invasion force (with more land units) for the next attempt, and try, try again.

The Ravages of War

Finally, remember that every time a city is captured (and recaptured) or successfully bombed by bombers (not fighters), its production efficiency is reduced. Thus, while you are fighting back and forth over the enemy's cities, they are steadily declining in their ability to wage war against you. Eventually, his economy will be in ruins and your task of conquering him will be that much easier.

Conversely, of course, when you capture his cities and switch their production to the land units that will help sustain your overland conquest of the enemy's island, they will not be producing new troops as fast as the cities you left safely back home.

26. Therefore, a steady stream of reinforcement must be brought in from across the great ocean. You will need enough reinforcements to beat back the enemy counterattacks and then build up (and sustain) a final offensive.

It won't be easy, but you're up to the challenge by now. Persevere, as the British do, and, ultimately, you will prevail in this scenario.

CLOSING NOTES FOR THE ADVANCED GAME TUTORIAL

At this point, all that there is left are small matters of fine tuning your style for more efficient game play and tips to help you establish additional good playing habits. We offer them here so that you will play at a higher level of efficiency while enjoying the rest of this book. From

here on, we'll be focusing on Advanced Game play and how to master it.

- There is a neat trick to smooth map scrolling. Instead of using the slider bars or the F1 to F4 keys, simply move the cursor to the edge or corner of the screen and hold down the left mouse button. The map will smoothly scroll in that direction. It's great. Try it! Also, pressing C will center the map over the unit that is currently awaiting orders. That will prove a great time-saver, too.
- Path moves will quickly become your best friend when trying to manage a large empire. Basically, path moves set automatic destinations for units from one city (or air base for air units) to another. For example, if you are building land units at one city and want them to move automatically to where the transports will be meeting them, you can set up a path and simply forget those land units until they arrive at their designated embarkation point. Here is how paths are created:

  From the Menu bar, under Commands, select Paths Mode (or simply press F8) and click and hold the left mouse button over the departure city; drag the mouse to the destination city (or air base if it will be exclusively an air-unit path), and release the left mouse button. The Movement Path window will pop up, and you must then select the unit types you desire to automate. Every unit of the specified type that appears/arrives in the departure city will automatically be forwarded with a Go To movement order to the destination site. Land, air, and sea units can all be toggled on and off separately or in any combination. (Be careful when setting the distance of a path for air units; remember that fighters have a shorter range than bombers). Toggling them all off or drawing a path back to its destination point cancels a Movement Path command.

  Liberal use of movement paths will have your units being built in the rear automatically moving themselves up to "the front" with a minimum of fuss. By concentrating them at key departure points near the fighting, you can better spend your time conducting the war, rather than struggling through the logistical battles of bringing up the rear-echelon troops.

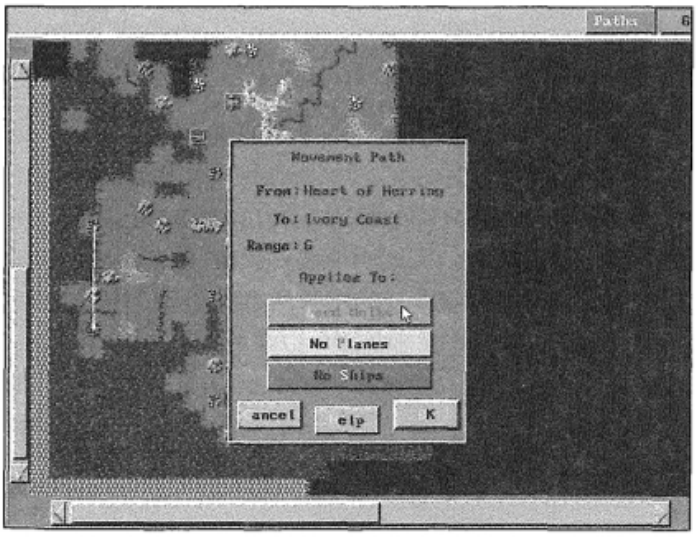


Figure 4.1 Setting a Movement Path

- Often, it is wise to have some armies on a large landmass performing patrols or on sentry duty along the coast (i.e., watching for invasions), both of which are explained in Chapter 9, which is all about combat. When the enemy has landed, however, and it is time to react, performing a Group Move, as shown in Figure 4.2, can be a real time saver.

This is done by selecting Group mode from Commands on the Menu bar (or pressing F7). This allows you to place a starting Group Move cursor box anywhere on the map and "nail" it in

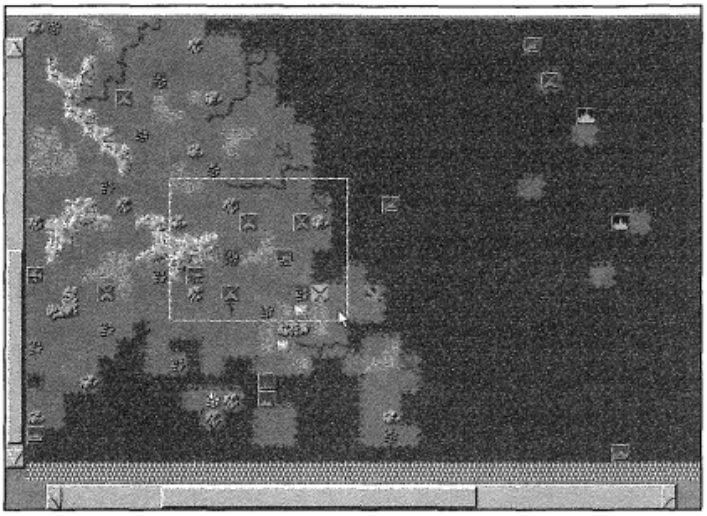


Figure 4.2 Units encased in a Group Move cursor box

place by clicking and holding the left mouse button; while still holding down the left mouse button, drag the square to encapsulate all of the units and cities with units you wish to give a single order to. At this point, either go back and get the Menu bar and look under Orders to tell all those units what to do, or press the appropriate command key (generally you will either want to clear their orders or issue them a single Go To command). In an instant, every unit under the Group Mode cursor will receive that order and follow it. Note that this is also useful for mobilizing an island's garrison and heading it to meet a transport for a speedy evacuation.

- This scenario is balanced in Player 1's favor. If you would like a more challenging rematch, you can always give yourself either a combat or production handicap (or both!). You also can set the computer opponent to play as an expert player when setting up the game. Additionally, try playing the side of Player 2 and see if you can win! (Now that is a challenge.) Any of these variations can be selected from the Player Setup screen when you start another game of this scenario.

GOOD HABITS

While bad habits are hard to break, good habits don't have to be hard to make. Allow us to offer you a few, easily learned habits that, if drilled into your subconscious at the beginning of your *Empire Deluxe* playing career, will help you through the tight spots. We hope that you eventually learn to do these things automatically, without even thinking about them, so that you can concentrate your playing attention on more important matters of strategy.

1. Restart games that don't initially go well. There are times when you might find yourself beset early by an unlucky start, particularly in games with randomly generated maps. This can prove ruinous and, ultimately, not a lot of fun. This is particularly tragic if it looks as though you are on an interesting map. In such cases, simply start a new game. Perhaps you'll have better luck (and more fun) the next time.

2. Keep an eye on airplane ranges. When the blue "LOW ON FUEL!" indicator pops up on the Information bar, press [H] and get that airplane home!

3. In fact, **watch the Information bar at all times.** It tells you in words what the map shows you in pictures, usually with more detailed information. Consider it a prime intelligence source to be monitored at all times. (Its three previous messages can be recalled on it, by the way, by simply pressing [-].)

4. Learn, live, and love the Wait command! When you need to maneuver groups of units through constricted areas or want to time a transport's unloading of troops just right, often players will press [Spacebar] and end a unit's turn. Generally, giving it a Wait command (or pressing [W]) is better.

The Wait command tells the computer that you want to come back to that unit later in the turn, thus giving you a subsequent chance to move it after some of your other pieces are positioned out of the way and/or have fought their battles. By using the Wait command, you can get the easy moves done first before attempting the tricky ones.

5. Always take a moment every 10–15 turns or so to step back and survey your situation.

- Call up the Production Map and reflect on your overall production strategy. You may want to adapt either it or your battle plans so that these two crucial elements work together in harmony.
- Reconsider the value of your air bases, patrols, convoys, and garrisons. Any units performing these duties that are no longer useful should be reassigned to a more productive purpose or disbanded.
- Weigh again your diplomatic situation, with both other human players and computer players (see Chapter 13). Make plans for improving your situation and worsening the enemy's.
- Reassess your strength versus your enemy's strength, and see if you should shift from defense to offense, or vice versa (see Chapter 8).

6. Keep producing transports once you've established any kind of a multi-city empire. It seems that you can never have enough transports, and they are lost very easily. Replacing their losses from scratch is a long process, so keep the assembly lines rolling them out, nonstop.

7. An important word of advice: don't put a bunch of units in a city thinking that it will help you to defend it. While it may prove useful on occasion to have units in a city so that they can counterattack an invasion, units in cities offer no additional defense against any kind of attack by enemy land units. Instead, the city defends just like a single, little old infantry unit and, if it falls, every unit in it dies automatically. Ships are particularly vulnerable in cities attacked by enemy air units (see Chapter 9). Yikes! Don't let this happen to you.

LAND, HO!

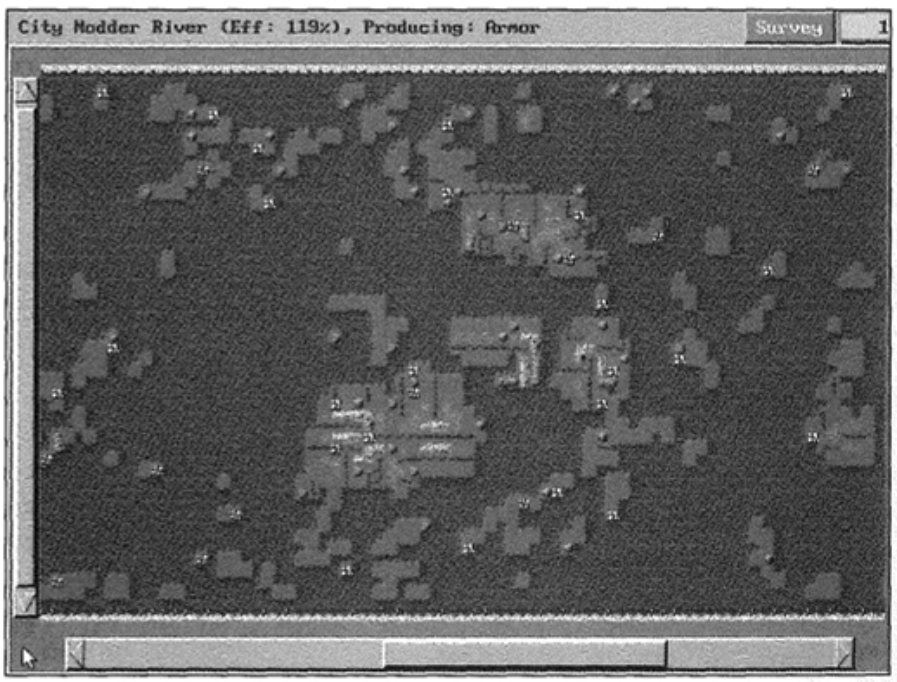
So ends our excursion into tutorial gaming excellence. By learning these three scenarios in their proper order and playing them each a time or two, you have now mastered the core elements of *Empire Deluxe*'s Advanced Game and are ready to move on. In the chapters ahead you will learn much about the military, economic, and discovery strategies that make for winning play in *Empire Deluxe*. There will even be examples of proper play based on your recent tutorial gaming experiences. Hopefully, this will answer the many questions that you had during play.

Now that you are armed with your tutorial diploma, it's off to graduate school by way of the remaining chapters. There are many new worlds out there for you to discover. Coincidentally, that also happens to be the subject of the very next chapter. Turn the page, Columbus, and see for yourself.

5

The Lay of the Land: Maps and Terrain

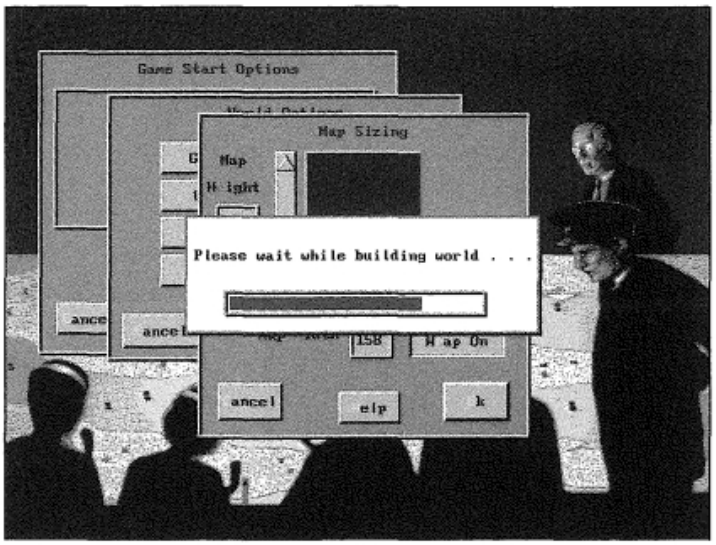
Wars are won by controlling land. Of course, it helps to know what the shape of the world is. (Will every wiseguy answering "round" please sit at the back?) While the next chapter will discuss how to pull a Christopher Columbus and *discover* worlds, it will help to first learn how the computer *creates* them.



The shape of the landmasses and the character of the terrain on a world usually determine the strategic nature of campaigning on it. The elements of strategy will come in future chapters. Right now, the worlds await.

HOW IN THE WORLD IS A WORLD CREATED?

What God was busy doing on Day Three (separating the waters from the land), the world generation routines in Empire Deluxe approximate in their own crude, mechanical way. In a matter of moments (depending on the size of the world and the speed of one's computer), a world, ripe for conquest—and complete with distinct cities dotting the landscape—can be generated and ready for play. Let us take a moment to consider what goes through the computer's brain while it's busy creating a world.



Player-Defined Parameters

If you've ever been told that size doesn't matter, you've probably been lied to. In *Empire Deluxe*, at least, it matters a lot. It is a simple corollary that the larger the world, the longer the game will be. In *Empire Deluxe*, players are fortunate to be able to vary the map height and width with considerable flexibility. The height of the map can range anywhere from 20 to 150 squares, while width may vary from 20 to 200 squares. Table 5.1 compares the size of the ring in which players will box during a game of *Empire Deluxe* relative to other popular strategy games.

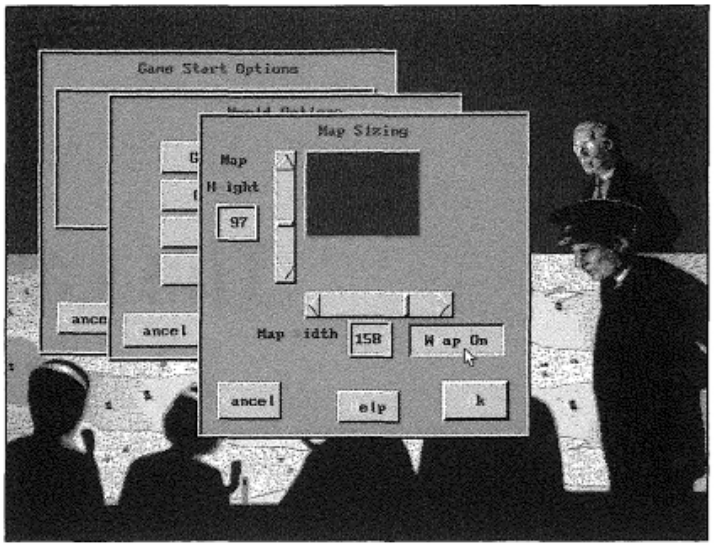


Figure 5.1 Here is where players help define the world.

Strategy-game maps come in two general varieties, those that *wrap* and those that don't. If a map wraps, this means that a unit moving off the eastern edge continues from the western edge. In other words, the world is shaped like a cylinder, with an impassable barrier to the north and south (the top and bottom map edges) and is circular to the east and west (i.e., there are no left and right map edges—one is a continuation of the other).

In *Empire Deluxe*, you can define the exact height and width of the map as shown in Figure 5-1, by way of slider bars or, for more precision, directly by typing in the numbers desired. You can also toggle on or off whether it will wrap (i.e., whether the left and right edges will be connected, making the map cylindrical). These two features have a major influence over the nature of the struggle ahead. Their strategic impact is discussed in detail in Chapter 14 (which examines all the elements of scenario design).

The wrap feature is east-west only. It didn't make sense to allow for a north-south wrap. East-west creates a cylinder,

TABLE 5.1: MAP SIZE COMPARISON CHART

SIZE	HEIGHT	WIDTH	TOTAL SQUARES
EMPIRE DELUXE MAPS:			
Empire Deluxe (smallest)	20	20	400
Empire Deluxe (largest)	150	200	30,000
MAPS FOR OTHER COMPUTER STRATEGY GAMES:			
Empire (Interstel version)	60	100 *	6,000
Civilization	50	80	4,000
Command HQ	136	320	43,520
Battles of Destiny (smallest)	25 **	25	625
Battles of Destiny (largest)	100 **	100	10,000
Global Conquest (small map)	75	100 *	7,500
Global Conquest (medium map)	112	150 *	16,800
Global Conquest (large map)	150	200 *	30,000

* These worlds are flat and do not "wrap" like a cylinder.

** Oddly, these maps wrap not only east and west, but also north and south.

which can be said to approximate a sphere (especially for a world where extreme conditions prevent usage of polar regions anyway). Having both east-west and north-south wrapping would not create a sphere. It would be a toroid, which doesn't make any sense.

As an aside, the east-west wrap feature was a huge and expensive problem for us—much more than I anticipated when I put it in the original specs. It has taken a lot of additional code and created even more problems in debugging. And yet, it all seems so simple!

—Mark Baldwin

When the wrap feature is toggled off, the corners of the map are safe havens for players to hide in since there will be solid east and west map edges that enemies cannot cross. (Holing up in a corner provides you with a couple of guaranteed secure borders along the map edges.) Instead of the arctic ice graphic look of the north and south map edges found when the wrap feature is on, when the world does not wrap all four map edges will have the generic border-pattern look.

Computer-Defined Parameters

So what is the computer thinking while it is creating a new world? How does it know where to put the landmasses and how large they will be? What

about terrain placement? How are the values of cities and player starting locations determined?

The answers can be found in the elaborate world-building routines built into *Empire Deluxe*. While this part of the program was created by a rocket scientist (Mark Baldwin), we'll try to explain its fascinating workings so that even we nonrocket scientists can understand it.

Wetness and Roughness

With the player-defined parameters already set, the computer makes two very important initial decisions before building a world, neither of which is influenced by anything you can control. The artificial intelligence randomly decides the two crucial world-building variables: its *wetness* and its *roughness*.

Wetness primarily regulates the ratio of ocean squares to land squares on the finished map. It also affects the number of rivers that will be placed on the map, and, the larger the wetness variable, the greater will be the amount of forest squares on the map.

Roughness controls how abrupt the land-to-ocean transition will be. In other words, the more roughness there is, the greater the chance for Indonesia-style archipelagoes. Lower roughness, conversely, will create larger, smoother continents. A higher roughness variable increases the chance that the landscape will be painted with plenty of mountainous, rough, and forest terrain when the world is being created.

I always have to weigh features like this: is the value added to the game greater than the cost in increased complexity? This one [allowing players to set their own levels of wetness and roughness] didn't make the cut. I knew that some players would want it, but most wouldn't care about it.

—Mark Baldwin

At one stage in the design process, these two variables were going to be player-defined. Thus, players could set their own levels of wetness and roughness and have the computer create theme worlds to their own exact specifications. However, this idea was rejected at White Wolf because, while it was easily implemented (and may yet be in some possible future upgrade), it was not easily explained and would only be of particular use and interest to more advanced players. The authors of this book can sympathize—it was a challenge to write this section of the book with simple explanations—but we hope to see this feature added in the future (since those reading this book are, after all, advanced players).

High Points and Low Points

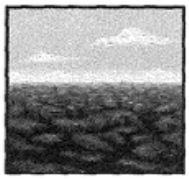
Once the wetness and roughness variables have been determined by the computer, it "builds a world of altitudes," according to programmer Mark Baldwin. In other words, the computer takes every square on that flat, two-dimensional map and gives it a number representing a third, vertical dimension.

Initially, these altitude numbers are all randomized. How these altitudes are initially determined must be envisioned as pushing little wooden bars into a sheet of aluminum foil from both above and below. Visible, shaped landmasses and unseen deep ocean ravines, both complete with slopes of ascending and descending altitudes, are created each time the computer "pushes" bars of ridges and depressions into this map of random altitudes. Thus, the altitude map takes on a distinct personality as these block-and-bar patterns are impressed on it.

The number of pushes made by these pattern blocks, and how weak or strong each push will be, varies according to the predetermined roughness factor—the greater the roughness, the greater and more influential each pattern-push

made will be. Continental and oceanic patterns are then added to the world to give it a continuity that simulates natural plate tectonics.

Just Add Water



After the above alterations have been made to the altitude map, it rains—big time. The map fills the lowest-numbered-altitude squares with water until the right percentage of them becomes ocean terrain, in accordance with the predetermined wetness variable. This will always include the row of squares next to each defined map edge (giving ships a great deal of peripheral mobility). After the seas are thus formed, the roughness factor is rechecked. At this point, the highest-altitude squares become mountains while the second-highest tier of squares becomes rough terrain.

Rivers are created next and are, naturally, tied to wetness. The wetness variable generates a predetermined number of needed rivers. These rivers are created by the computer randomly placing the head of each river on land and then flowing it downhill, converting mountain and rough squares along its path, by following the altitude data previously generated until it hits an ocean square.

Forests are placed in a fairly random pattern, being tied to both roughness and wetness variables (the more of either, the more forests there will be). However, when placing forests, the computer shows a bit of favoritism for certain squares. Basically, a random clear-terrain space is selected and the computer decides if it should become a forest or not. Each nonclear, nonocean square next to the square selected for forest placement will increase the chance of a forest being placed there.

The Urban Jungles

Now all that remains for the computer to do to complete the world is to place and define the cities that will dot the map. The process used for deciding the location of cities on the otherwise completed map is a bit more tricky to explain, but we'll try to present the information and explain a few probabilities to you as best we can.

Before placing any cities, the computer determines how many it will place on the map (that number being the lesser of the total number of map squares divided by 50 or the total number of land squares divided by 15). The computer places cities by checking the entire map and looking at every nonocean, nonmountain square and giving each a probability of being replaced by a city square. Continents (landmasses containing more than *one* land square) have four times the chance of receiving a city than a lone island square does.

> Players who remember the old *Empire* as having a more densely packed urban landscape than *Empire Deluxe* are probably correct. *Empire* could have a maximum of 75 cities placed on its fixed, 6,000 map squares. *Empire Deluxe*, however, while offering a scenario maximum of up to 200 cities, may have to spread these out over a map of up to 30,000 squares. Depending on the scenarios compared, the maps in *Empire Deluxe* may well be more sparsely populated by cities than those in the old *Empire* game.

A port is defined as a city next to a qualifying ocean square—the qualification primarily being that the ocean square can trace to the map edge through other, connected ocean squares. Thus, by definition, cities next to small, inland lakes or seas are not counted as ports.

The mountains won't have cities, so that the narrower mountain chains don't get broken up. It was an arbitrary decision on my part. Those mountains are supposed to be *really* rugged.

—Mark Baldwin

If the randomly selected square is a port location, or there is a port city already somewhere on its landmass, that square is selected automatically. If neither of these conditions is true, the city moves to a port location before it is placed. In other words, the first city on any landmass will be a port (this is crucial to keeping the artificial opponents from getting confused when they play).

Before selecting the next city to be placed, all the squares within a five-square radius of a newly placed city have their probability reduced in the next-city-square-placement lottery. Adjacent squares have their city-site-selection odds greatly reduced (making adjacent city squares highly improbable), while at the extreme range of five squares the reduction is nominal. These effects are cumulative should multiple cities be within five squares of another square eligible for city placement. For example, if two cities should be placed close together, the squares between them would have their city-site-selection chances doubly reduced.

Why Did We Start There?

Another mystery of map making is how the computer decides which will be each player's initial city. Quite simply, the player's starting cities are determined according to a list of priorities that the computer runs through, thus:

1. First the computer will look for several different continents (equal to the number of players in the game) each of which contains two to three cities. This is the most-preferred starting location that the computer will select (so get used to it).

It [a two- to three-city island start] feels right. Again, that's another one of those arbitrary or subconscious decisions that simply seems to work.

—Mark Baldwin

2. Failing that, the computer searches for *any* set of continents equal to the number of players in the game that have an equal number of cities on them. In other words, everyone will start with the same number of cities, although it won't be in the designer-defined, optimal two-to-three range. This is often the element that causes games where players begin with only a single city each.

3. If the conditions for step 2 can't be met, the computer starts to fudge on being strictly fair in trying to give everyone an equal number of cities. Instead, it looks for enough separate continents (so that every player will have one of their own) that have close to the same number of cities, but not the exact same amount, on each.

4. If none of the above conditions can be met, the computer simply throws up its microchips and places initial cities on any separate continents that it can find.

Note that the player starting city-selection routine will also tend to create the maximum

separation in cities/continents between players wherever possible (although there is no minimum distance between players' starting cities defined in the program—so beware).

> There are all sorts of factors that probably could, initially, give one player an advantage over another. Those things could bite you even worse [than any unbalanced initial-city placement]; losing three armies taking your first city, for example. No game is perfectly balanced (especially one that has random numbers in it).
>
> —Mark Baldwin

Note that in all of the above criteria, the computer is only checking for *numbers* of cities on a landmass, *not* their individual production efficiencies. Thus, players' starting positions are *not* balanced in terms of nearby production capabilities. Of course, the larger the randomly created world and the fewer the number of players in the game, the more likely it is to meet the two-to-three city, programmer-defined optimal start standard.

The Economic Landscape

How city starting efficiencies and production specialties are determined when the world is being created for an Advanced Game is purely random. As you've probably noticed, player starting cities are all set to 100 percent efficiency with no production specialty. All other cities are created according to the following probabilities: Each city's starting production efficiency will be a random number between 60 and 160 percent.

A production specialty, if any, is determined by the outcome of two *die rolls* made separately for each city. The first die roll gives that city a 1/3 chance that it will not even bother to try to have a production specialty. If the other 2/3 of that die roll come out, the computer rolls a second die on what we shall call the *Production Specialty Table*.

When rolling on the Production Specialty Table, each item on it (there are 14 including all possible unit types plus cities and air bases—cities and air bases are treated as "no specialty" if rolled) has an even chance of being selected. If the city does not have that production type (cities, air bases, and naval units in inland cities), there is simply no specialty unit type produced at that city. In exact odds then, considering both die rolls, the probabilities of getting a city to specialize in a particular unit type break down as shown in Table 5.2.

WHAT IN THE WORLD IS ON IT?

Of course, every square is occupied by a single, particular terrain type. Here, we will give a thorough overview of each type of terrain and its general effects. Specifics concerning the terrain effects on combat will be more thoroughly explored in Chapter 9 while the economic geography of cities will be delved into in Chapter 10.

Ocean

Like our own planet Earth, most randomly generated maps in *Empire Deluxe* seem to have a preponderance of ocean squares. Unlike Earth, however, *Empire Deluxe* maps seem to have fewer large, continental-sized landmasses and more small islands, as a rule. This tendency increases the importance of the oceans and the naval units that must prowl them to ensure or block the safe passage of troops across them. Only land units can bring about ultimate victory in war, but the navy has to get them safely where they are going.

TABLE 5.2: CITY-PRODUCTION-SPECIALTY PROBABILITIES

(*Percentages have been rounded slightly.*)

A PORT CITY:

A (1 - 2/3 * 10/14), or 52.4%, chance of no specialty.
A (2/3 * 1/14), or 4.76%, chance of any given available unit specialty (10 different types).

AN INLAND CITY:

A (1 - 2/3 * 4/14), or 81%, chance of no specialty.
A (2/3 * 1/14), or 4.76%, chance of any given available unit specialty (4 different types).

Rule of Thumb: Half the port cities will have a production specialty while only one-in-five inland cities will.

Additionally, where ocean squares are next to land squares, the interaction of fleets and armies occurs. Troops can be embarked and disembarked, naval units can be attacked by adjacent land units, and land units can be bombarded by certain naval units. Indeed, there is a great deal of action to be found along the ocean's shores.

Clear

While all the land terrain effects are summarized in Table 5.3, clear (or "plain") terrain is not very exciting. It doesn't slow armor down (making it the fastest way to get around by land) or aid a unit defending in it (which is helpful if you're exploring or attacking).

What is the best part about clear terrain? Air bases can only be built on clear-terrain squares. While that may not seem like much to cheer about, it can be crucial. Therefore, embrace clear-terrain squares when attacking, when exploring with armored units, or when you need to build an air base.

Rough

There are only two differences between rough- and clear-terrain squares. First, armor units are required to spend *both* of their movement points to enter a rough-terrain square. Second, air bases cannot be built on rough terrain. Rough terrain offers no special combat advantages and is an inconvenient terrain type all around.

River

Wet worlds, in particular, can have many rivers, so it's important to know how to play them. Well, unless there are armor units in the game, think of them as clear terrain; if tanks are prowling around the map, they will be attacking at reduced strength against land units defending on river squares. Note that infantry units are not so penalized when attacking land units defending on river squares.

TABLE 5.3: LAND TERRAIN EFFECTS CHART

LAND-TERRAIN TYPE	SLOWS ARMOR INTO?	COMBAT MODIFIER WHEN A LAND UNIT IS DEFENDING IN, VERSUS: A LAND ATTACK	AN AIR ATTACK	A SEA ATTACK
Clear	No	None	None	Land Unit 1/2
Rough	Yes	None	None	Land Unit 1/2
River	Yes	Arm. 1/2	None	Land Unit 1/2
Forest	Yes	Arm. 1/2	Air Units 1/2	None
Mountain	Prohib.	Arm. 1/2*	Air Units 1/2	None
City	No	Ignored	**	Prohibited

* Armor units cannot advance after a successful attack into a mountain square.

** Land units defending in a city are ignored against an enemy attack by land. Instead, the city defends itself and, if it loses, any units in it are automatically eliminated.

Air units "bomb" cities in a manner different from all other types of attacks. A random target in the square is selected (including the city's current production and, against bombers, its production efficiency). The target of this attack is destroyed by a single hit. Fighters bomb cities with a 1/2 attack value. Chapters 9 and 10 give more details about the effects of bombing cities.

Important note: It only matters what square the defending unit is in for combat. The square the attacker is coming from has no bearing whatsoever on combat.

Forest

Forest is, perhaps, the best defensive terrain. It affords some protection against land, air, and sea attacks and can be entered by armor units (when they spend their entire move to enter the forest, that is). As in river squares, infantry units are not halved when attacking land units defending in forest squares.

Mountain

Mountains are the other best defensive terrain type. Like forests, they provide some protection against all types of attacks. Armor units, however, are prohibited from entering mountain squares. They may invade mountain squares, but will not advance after a victorious combat in them. Note that infantry units are not halved when attacking other infantry units defending in mountain squares.

City

Cities are an extraordinary terrain type, and many special movement and combat situations happen in them. For movement, cities are the squares that have an unlimited stacking capabili-

ty for all types of units (and this special feature makes cities the easiest place to embark and disembark units on transports, as demonstrated in the tutorials). It is also where damaged units can go for repairs.

Notice that the streets between the buildings of a city's map symbol will glow brighter when there are one or more units stacked inside the city, as shown in Figures 5.2 and 5.3. Of course, to find out exactly which friendly units are in there, you'll have to open up the city's pop-up window by double-clicking the left mouse button on it and then selecting Units. (The same brightness effect also occurs for air bases that have air units present). You can't see which units are in enemy cities.

For combat purposes, cities are immune to receiving attacks from naval units (although naval units inside cities are free to attack other, noncity squares). Against land attacks, only the city itself offers any resistance to the attacker, and, if it loses, the city falls and all the units in it are destroyed in one fell swoop.

Against air attacks, every unit in a city, plus the city itself, is given an equal chance of being the target of an air attack. One hit will destroy

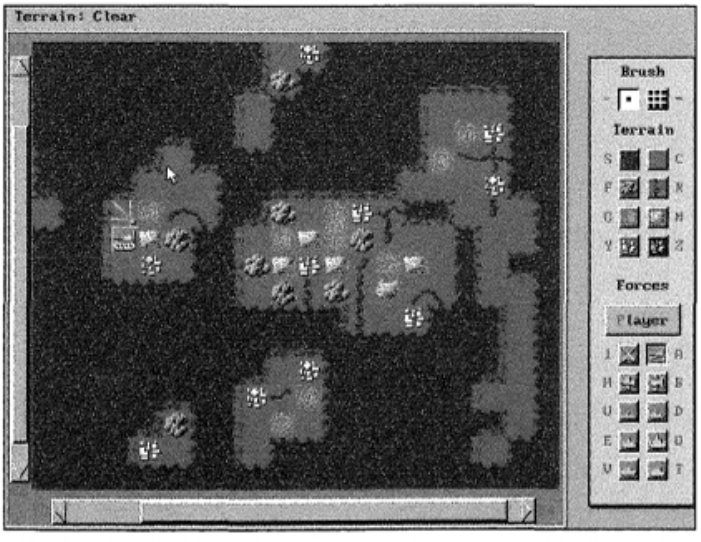


Figure 5.2

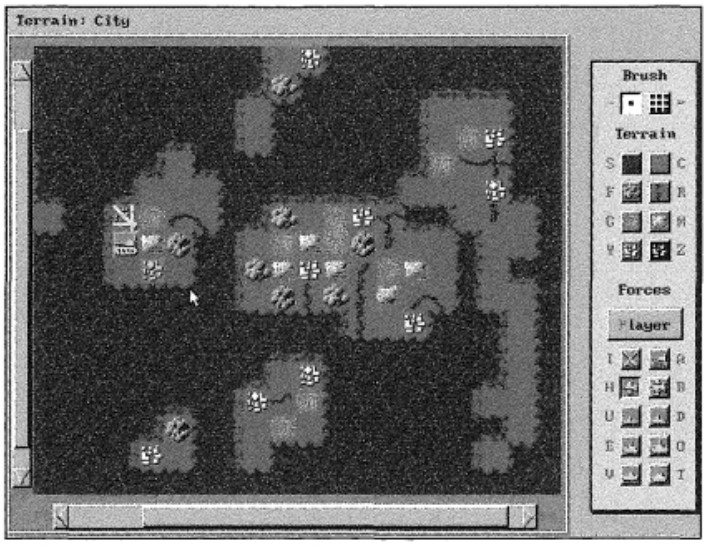


Figure 5.3

any target in the city (attacking ships in port with air raids, therefore, can be quite deadly). Basically, bombers have an even (50–50) chance of successfully hitting a target in a city, while fighters have only a 1/3 chance of successfully bombing urban targets.

Cities are also the economic engines of the game. For details on that subject, see Chapter 10.

A FINAL SURVEY OF THE LANDSCAPE

In this chapter you learned how random worlds are created, where starting cities are placed, and how production efficiencies and specialties are generated. Furthermore, an overview of the types of terrain dotting the world maps was made. Each terrain type was examined for its inherent movement and combat features so that the next chapter, on movement (and Chapter 9 on combat), will make more sense to you. So now it's time to get a move on to movement. Turn the page, and forward march!

Forward, Ho!: Movement

As you learned in Chapter 2's first tutorial lesson, there is more than one way to do just about anything in Empire Deluxe. Over his many years of involvement with *Empire*, Mark Baldwin has always striven to improve and refine the game's interface. With *Empire Deluxe*, players have even more power at their fingertips thanks to the addition of refined automated movement routines.

Veteran *Empire* players will quickly notice the improved Path feature. The Auto Explore feature has been added to *Empire Deluxe*, as has the ability of airplanes to fly over other units during movement. Transports, too, have received a special patrol ability that allows them to automatically convoy troops from one port to another. Many other, more subtle refinements and enhancements have also been incorporated into the game, including an enhanced four-point Patrol feature.

It is the purpose of this chapter to elaborate on the different methods of moving your units with authority and precision. Building on your tutorial experiences, you will learn the detailed hows and whys of using the powerful movement commands in *Empire Deluxe* and become a more efficient player. By optimizing your movement skills, you will find your games (and units) moving quicker. This will give you more time to plan strategies since you will spend less time on the more mundane matters of movement.

THE BASIC MOVEMENT STEPS

The first tutorial lesson introduced you to the two basic mechanics of movement: using the numeric keypad on the keyboard, plus the quick-click single-turn move and the long-click Move To techniques using the

mouse. The former method of using keystrokes is ideal for pinpoint precision movement. When you want to control every zig and zag of a unit's move, control it via the numeric keypad. Conversely, using the long-click Move To technique is a convenient way to set it and forget it for long moves. When shuffling around known territory over vast distances, the long-click mouse method works best. There is little more we can add here that your practical experience gained playing the tutorials didn't quickly teach you. By now, you probably already know what works for you.

Waiting, Skipping, and Activating Units

As a good habit at the end of the tutorials, you were told to learn, live, and love the Wait command and use it instead of the Skip Move command. A unit that waits will stop blinking for orders, and won't bother you again until the end of that same turn. Thus, it will move to the back of the line and ask for orders (blink) again after all your other moves for that turn have been made.

The Wait command is essential to master for proper play of *Empire Deluxe*. You already know that it is the key to unsnarling traffic jams in congested areas. Soon we will teach you an excellent use for it called the *waiting-bookmark-unit technique* that will prevent the end of your own turn from surprising you.

Another "trick" you can use to activate a different unit quickly when being prompted for orders is to double-click on it with the right mouse button. As long as the unit you click on has not moved that turn, it will be "activated" immediately. This is equivalent to selecting Survey mode, selecting that unit, activating it and then switching back to Orders mode (i.e., Resume). I don't think this trick made it into the manual. It's one of those subtle interface things that we added.

—Bob Rakosky

Issuing a unit orders to Activate, which is done while the survey (cross-hairs) cursor is over the unit—either through the Menu bar, by pressing A or most easily by simply double-clicking the right mouse button over the unit—tells it to go next. In other words, it enables you to decide manually the order in which you move your pieces. Naturally, this can be important around congested areas or to get units loaded and unloaded in the proper sequence.

Ordering a unit to skip its move, which is most easily done by pressing Spacebar, ends its turn entirely. You won't have another chance to do anything with it again until next the turn. Unless you're sure there is nothing that you want to do with a unit on this turn, don't be too hasty about giving it the Skip Move command. Give it the Wait command and come back to it at the end of your turn. You may have found a use for it in the meantime.

The Sleeping Sentries

If you want to just leave a unit where it is and forget it, you've learned in the tutorial scenarios about the time saving practicality of ordering such units to sentry duty. There they will sit, sleeping until circumstances waken them.

Wakening sentried units can be done voluntarily by a player simply by placing the cross-hair cursor over the unit while in Survey mode and selecting Clear Orders or giving it any other order (which it will follow in place of the Sentry order) except Activate. Also, a unit on sentry duty will wake up when enemy units or cities

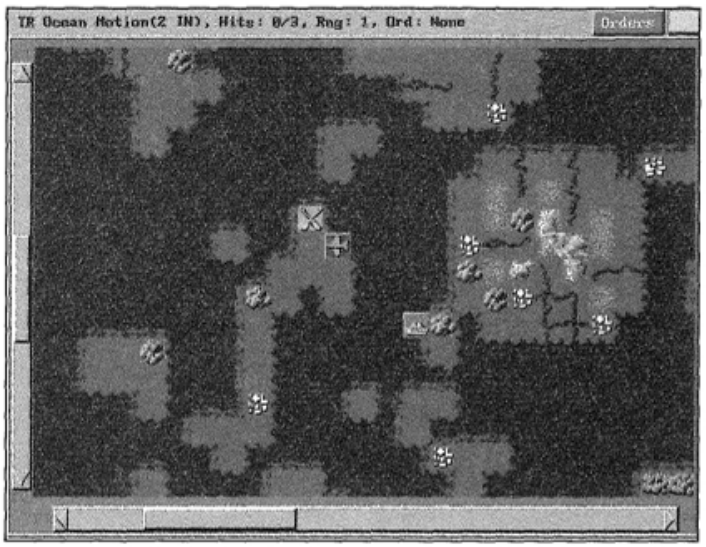


Figure 6.1 The fighter has awakened the adjacent, sentried infantry unit.

begin a turn within their sighting range. This includes the sleeping (sentried) cargo aboard transports and carriers.

When aroused from their slumber involuntarily by an enemy presence, sentried units will blink with a grayed (sentry status) background color, as shown in Figure 6.1. Skipping their turn (i.e., pressing Spacebar) automatically reissues their Sentry order and sends them back to sleep. A movement order of any type will waken a sentried unit fully.

The Waiting-Bookmark-Unit Technique

Once you have a small empire going, use the Wait command on a designated bookmark unit on each turn. A bookmark unit is an innocuous unit guarding some out-of-the-way place. This bookmark unit cannot be given Sentry orders (or else it would not get the opportunity to Wait on each turn). When it is the bookmark unit's time to receive its final orders at the end of your turn (which should usually be a Skip Move command), *that is your reminder to double-check your automated moves, production, and diplomacy and to save the game before the computer players' turns begin.*

By faithfully taking this opportunity to recap your every turn and save the game in this manner, you will be able to better control your lot in the game. While recapping your turn, for instance, you might be able to correct some omissions you may have made. Ask yourself:

- Did I get to clear the orders of all the units that I wished to who are on sentry, patrol, or some other automated movement command? (Don't forget about sentried air units, if you have any. They may be difficult to locate since they will be inside a city or air base. You'll just have to click around until you find them.)
- Are all my transports unloaded that I wished?
- Did I want to activate on a coastal square using the Load command any transports that are not yet filled to their capacity?
- Did I change my production at desired cities?

Remember, once your last unit has finished its action, the computer ends your turn without giving you a chance to make any changes or study your situation. In fact, if all of your units have preset orders, you may not even get a chance to do *anything* that turn!

The problem of the game continuing due to having units with preset orders was a delicate one to solve. The reason is that I didn't want to keep interrupting the game with "Are you done?" dialogues. I think the solution works, though. The computer will ask "Are you done?" under certain extreme circumstances, but you can also break the game at any time by simply pressing Esc.

—Mark Baldwin

Finally, saving the game faithfully on every turn just before the computer player's turn may allow you to control its luck—you know, cheat (activating the AutoSave feature also works). Although the random-number seed (the "future die rolls," if you will) is retained in a saved game (meaning that if you restart it, the luck elements should come out identically), this does not always occur. It will vary *if* the screen begins over a different part of the map than the *exact* location where it was when the game was saved. (Don't ask us why, it's a programmer thing—but believe us, it works.) You'll have to experiment around with this feature if you're determined to cheat. We won't further elaborate on it here.

Thus, if the computer player's turn ends up to your great dissatisfaction, you can just restart the game from the saved point and make the computer play its turn over. Hopefully, if the initial map screen is in a different position than it was when you saved it, the computer player won't be as lucky this time around.

Clearing Orders

Because it is often vital to snap units out of their automated movement commands (Sentry, Patrol, Move To, Path Moves, Go Home, Escort, Load, and Auto Explore) so that they are back asking for new orders, learn this key: Insert. It is much faster to select a unit in Survey mode or by way of a group move and press Insert than to open pop-up windows and clear their orders manually through the menus.

The best technique for a "mass awakening" of your units is to encase large numbers of them within a single Group Move cursor (see below) and simply press Insert. If the game had a bugle playing a reveille sound effect, you would hear it now since every selected unit's orders have been cleared and they are now reawakened.

SEA MOVES

Naval units have a few special moves all their own. In particular, these involve transports and getting them to do their job as efficiently as possible.

Escorting for Safety's Sake

Veteran *Empire* players will remember this order as being thought of as a "Follow that car (er, boat)!" command. They must unlearn that now, for it is the case no longer. While a naval unit that is given an escort order must still be told which unit it is escorting, it no longer follows that unit, as it did in *Empire*. In *Empire Deluxe*, instead, an escorting unit aims its movement for a location two squares ahead of where the target unit is moving, getting there as best it can. Escorts now attempt to lead (as they should) instead of follow the ship they are escorting.

When one thinks of a naval escort, it is usually envisioned as several smaller ships protectively surrounding a few prize ships. So, too, it is in *Empire Deluxe*, with transports and aircraft carriers the frequent focus of the escorting ships. They are, after all, the prizes to be protected.

Caution should be used when giving a ship an order to Escort a destroyer. The faster-moving destroyer will soon leave its escorts behind, and, thus, destroyer and escort will lose the mutual defensive advantages of escorting in the first place. Conversely, giving destroyers Escort orders to lead other, slower ships works out very well. Once the destroyer is in front of its Escort target,

the computer will spend its extra moves hovering around that ship, thus affording it a bit of extra protection.

One useful technique is to escort a ship with Auto Explore orders (see below). The ship being escorted could be a transport with troops venturing off into the unknown and looking to grab a quick city or two, or a cruiser or battleship looking to win some easy fights. Escorting a transport with a destroyer or cruiser, or escorting a cruiser or battleship with a destroyer, will not only increase the number of squares revealed through exploration but also send an effective hit team, working closely in tandem, into the unknown.

The Load Command and "Getting Loaded"

There are two ways that transports can use the Load command: one practical and one comical.

The practical way to use the Load command ([L]) is to issue it to a transport located in a port city. If there are any land units in the port, a pop-up window will appear like the one in Figure 6.2. From there, you choose which units (if any) will be loaded aboard that transport.

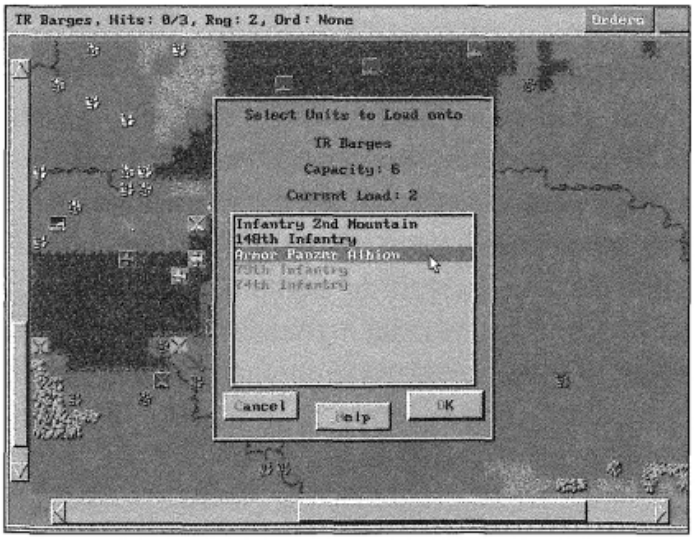


Figure 6.2 The Load command pop-up window

If none are selected, that transport can freely leave the port without any cargo. Note that a transport that does not use this Load command while in a port will automatically load as many land units as possible (giving armor units priority). Thus, if you want a transport to leave empty handed from a port full of troops, you must use the Load command and tell it not to pick anybody up.

The comical way to issue this order is to give it to a transport that is not in a port, but at sea next to a land space. When this happens, the transport "quits" the war (ceases to blink, thus no longer requesting new orders) and throws a big party (hence, you can rightly think of them as getting loaded). The transport's party is so wild that it beckons like a siren call to all land units that happen to pass next to it. This is seen when the adjacent land units automatically climb aboard the transport with their next move, join the party, and, partied out, fall asleep on board (i.e., they switch to Sentry duty). Only when the transport is completely filled do they realize that the party's over, when (brimming with sleeping passengers) the transport will again blink and request orders (and wonder where they should drop off all those hungover land units).

There is one comical caveat. When a transport's cargo capacity is one point away from being full (for example, when there are already five infantry units already on board), it will not automatically pick up an armor unit that passes by (because they count as two cargo points each and would overload the transport). Instead, it will wait (forever, if necessary) for another infantry unit to stroll by and top off its load before reactivating itself.

The Unload Command (When You Want It)

Issuing an order to unload is a multipurpose command. It has three very distinct uses:

First, and most commonly, it is issued to blinking transports that are carrying troops. The effect of the Unload command here is to clear the Sentry order of the troops on board. This will only work while there is an adjacent land space that they can move to.

For example, if a transport pulls up next to a one-square, noncity island (such as the dipper islands in Chapter 4's third tutorial scenario) and is issued an Unload command, a land unit on board the transport will blink. If it is moved onto the one-square island, the other units on board the transport will automatically go back to sleep on sentry duty since there are no further land spaces next to the transport for them to occupy.

There is one problem in issuing an Unload command in this manner. If you want to issue it after the transport has no moves left for that turn (i.e., it is no longer blinking—your next unit is), it won't work until the next turn. On the next turn, however, is often too late. (Note that this has been fixed in the 3.10 version of the game, as explained in Chapter 16.)

Fortunately, you can unload troops from a transport that has already completed its move for this turn by simply clearing the troops' orders. The easiest way to do that is to put a Group Move (F7) box (see below) over the transport's square and then clear everyone's orders (Insert). Alternately, the method that requires considerably more effort is to double-click the left mouse button on the transport's square and wake each unit on board individually through the pop-up windows.

The second way to use the Unload command is on an aircraft carrier with sentried fighters on board. Telling the fighters to Unload, however, merely awakens them. As with debarking land units, the inconvenient problem of an aircraft carrier that has finished its turn being unable to make use of this command without manually hunting it back down also exists (along with the same solutions).

The final way to use the Unload command is only available when playing by the Advanced Game rules, and that is to issue this order to land (infantry and armor) units so that they will be converted into air bases. Issuing this order is always followed by a confirmation request because this is a one way conversion process. Air bases can never be converted back into infantry or armor units, and, like other units, air bases are removed when eliminated in combat or voluntarily disbanded by their owner.

Automatic Unload Commands (Wanted or Not)

Certain other occasions automatically wake sentried units aboard transports and aircraft carriers. For example, whenever either of these ship types enters a friendly port *that is their target destination*, the units they were carrying become active (with this exception: land units won't awaken on single-square island cities). Fortunately, if the computer moves a ship through an intermediate friendly port while en route to its target destination under an automated command (such as Move To or Patrol), their cargo will still remain asleep.

Transports' troops get excited (and wake up) when next to enemy cities, land units, and neutral cities (i.e., the types of targets they can attack from the transport's square). When this happens, you

may want to make use of the Wait command so that you can attack with the proper unit (infantry as opposed to armor) first off the transport (see Chapter 9 for correct combat tactics). Note that once the object that caused these units to awaken is removed, the rest of the troops on board the transport automatically go back to sleep on sentry duty. If you want more of them activated, you'll have to waken the rest of them yourself.

Another occasion that arouses sleeping cargo is being next to enemy units. Naturally, the fighters aboard a carrier will be aroused by the proximity of any newly discovered enemy unit or city (they will sleep through the discovery of neutral cities, however, since they are unable to attack them).

The Transport "Convoy" Technique

A clever feature added to the game's programming (thanks to a playtester's suggestion) was to modify slightly the way transports with Patrol orders work. Transports can now be set to pick up all the troops they can carry at one port and drop them off at another. By creating these automated *convoy routes*, land units that must cross the ocean to reach the front can be brought up with nary a thought given to them.

To set up an automated convoy route with a transport unit, move it to the port where you will be picking up land units. Once there, issue it a Patrol order (described below) that makes its first port of call the location where you want the troops automatically off loaded. That's it! Note that only one port of embarkation (the origin point of the patrol route) and one port of debarkation (the first port set on the patrol route) can be established for a single transport convoy. Transports on convoy routes will not wait for a full load of units at their port of embarkation. Furthermore, they will give priority to carrying armor units if any are available at their port of embarkation.

To support these automated convoys, it is wise to have other ships and airplanes patrolling the convoy route. Naturally, these transport convoys work well with land units that are using automated path moves (described below) to reach their port of embarkation. Such an arrangement gives your rear echelon a well-oiled-machine look to it on each turn as troops automatically appear and then head where they're needed.

FANCY MOVES

In this section you will learn all about the most powerful commands for automating troop movement. When engaging the enemy along the front lines, there is no substitute for precision numeric keypad-type control (this includes adjacent-square mouse clicking movement, for all you mouse fans). At other times, when a unit's purpose in movement is clear, automation should be preferred over the usual constant bother of their blinking on every turn. These movement circumstances and the tools for automating them are described next.

Go Home Orders to Avoid Trouble

When an air unit indicates that it is out of fuel or when a slightly damaged ship should head back for immediate repairs, it can be a real time-saver (read: keystroke saver) simply to issue it the Go Home command (H). An air unit will immediately fly back to the closest city, air base or carrier (if it is a fighter), while a ship unit will head for the closest port it can reach. (This might not be your choice for its opti-

mal destination, but you're being lazy by using this command and that's the price you pay.) The Go Home command works similarly to issuing a Move To command, in that the unit will continue on its way in an automated, trancelike state until it either reaches its destination or encounters enemy units along the way. Because of the chance of enemy encounters, you might want to move heavily damaged ships home by direct control, taking them along a safer, less direct route.

Finding Your Way Through Auto Explore

In the second and, particularly, the third tutorial scenario, you got intimately acquainted with the Auto Explore command (X). Giving a unit this order lets the game's exploration algorithms loose on it, game turn after game turn, in perpetuity. It will continue to explore until there are no black squares nearby for it to discover or until a combat target is encountered. In either of these cases, it will stop, blink, and request new orders.

In the next chapter, we'll tell you all about exploration in general and Auto Explore in particular. Also, you will discover the logic followed by the computer as it moves units using this command.

Pacing Through Patrols

Patrols are set for units so that they will move in a constant loop and, thus, continuously monitor their patrol area for enemy activity. (Additionally, transports on convoy duty will load and unload troops as explained above.) Setting a Patrol order (P) requires having a unit already at one of its desired patrol points. From there, the cursor must be moved to another point and nailed down there with a click of the left mouse button or by pressing Enter. At least one, but up to three, other points on a patrol route can

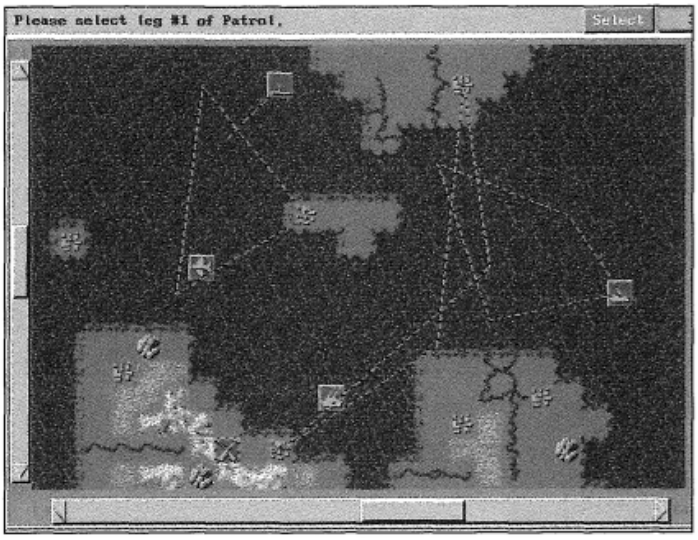


Figure 6.3 Three sample patrol routes

be set, as shown in Figure 6.3. (Unfortunately, the only way to find out exactly what path your units will take between these patrol points is to watch them move between them.)

The fighter on the left in Figure 6.3 has a three-point patrol route watching for trouble from the west. The submarine in the top center has a short, two-point patrol route and covers the northern passage through the channel. The destroyer on the right is running a four-point patrol route, trying to cover the large gap between the two landmasses to the north and south. The transport's patrol route is actually a convoy route bringing land units up from the city in the south (where the cursor is pointing) to reinforce the city in the north

By their very nature, patrols (moving back and forth to keep an area under observation) are a defensive operation. In Chapter 4, you should have gained some experience setting up patrols to defend your home continent. Here are some further tips and observations: It is impractical to set land and sea units on patrols between widely separated points. After all, how can they be expected to see all the spaces on either end of a patrol route when it takes so long to cover the space in between? Widely separated patrol

points will only leave holes in your curtain of observation that the enemy can drive through without any warning. As a rule of thumb, two to two-and-a-half times a unit's per-turn movement range is a safe maximum distance apart for placing the extreme end points of a patrol route.

Airplanes on patrol probably should engage in flight paths that are one or two squares less than their maximum range out. This way, if they encounter any enemy units at the extreme end of their patrol route, they will have some movement left with which to either attack or flee. For efficient patrolling of airplanes that need to cover a wide observation area (such as the fighters on a carrier often do), use multiple airplanes in triangular patrol routes. These should radiate out from their base, like the spokes of a wheel, forming adjacent, pie-shaped triangles.

There is little difference between what happens when a patrolling unit or a sentried unit encounters an enemy. The alerted patrolling unit will blink with the same gray background as shown in Figure 6.1. Likewise, skipping their turn (i.e., pressing Spacebar) automatically reissues their Patrol order while a movement order of any type will cancel it. Thus, if sentried units can be thought of as sleeping, patrolling units should be thought of as *sleepwalking*.

The Group Mode Command Moves the Masses

The section at the end of Chapter 4 (following the third tutorial scenario) explained a great deal about when and how to use the Group mode movement command (i.e., the *group move*). Experience is likely to teach you that there are few opportunities to make good use of a Group Move order (i.e., there are few occasions where it will truly save you time). Generally, when you wish to have a mass awakening of units that are currently entranced by automated movement orders (Sentry, Auto Explore, Patrol, etc.), presumably with the intent to send them somewhere, or you wish to put a stack of units in a city, transport, aircraft carrier, or air base asleep (i.e., on sentry duty)—those are good times to consider using a Group Move.

> There is a special, easier way to select Group Mode. Just hold down the shift key, click-and-hold the left mouse button, and drag the mouse.

Group moves are performed by selecting Group Mode from Commands on the Menu bar, or pressing F7. Using either of these methods allows you to place a starting Group Move cursor box anywhere on the map and nail it in place by doing a held click with the left mouse button, as shown in Figure 6.4.

While still holding down the left mouse button, drag the Group mode square cursor to encapsulate all of the units and cities with units in them that you wish to give a single order to.

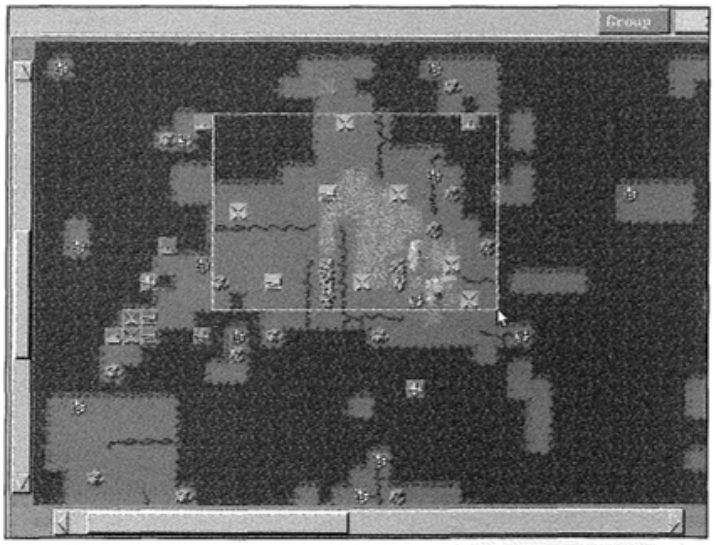


Figure 6.4 The enemy has landed and the sentries are selected for mobilization en masse with a Group Mode movement command (i.e., a group move).

At this point, either go back and get the Menu bar and look under Orders to tell all those units what to do, or press the appropriate command key. In an instant, every unit under the Group Mode cursor will have that order and follow it.

Path-Mode Commands Create Robo-Reinforcements

Again, at the end of Chapter 4's third tutorial game, you were urged to put some Path Mode commands (i.e., *path moves*) in place and experiment with them. Paths allow you to set automatic destinations for specific unit types to automatically go from one city (or air base, for air units) to another. The exceptions would be that sea units can end their Path Moves on any ocean square while land units can end theirs on any connected land square. Note that setting a movement path from a city will not affect units there that are already moving under other orders (which means that setting paths won't screw up your patrols and convoys from that city).

The reason for creating movement paths is to automate the movement of rear-echelon units to the front. This can be very convenient. After all, if you know the general vicinity where every new unit a city produces will go, why not automate its arrival there and save yourself some bother? Setting up land unit paths to converge on a single departure port, as shown in Figure 6.5, is particularly useful when used together with the above mentioned transport *convoy* technique.

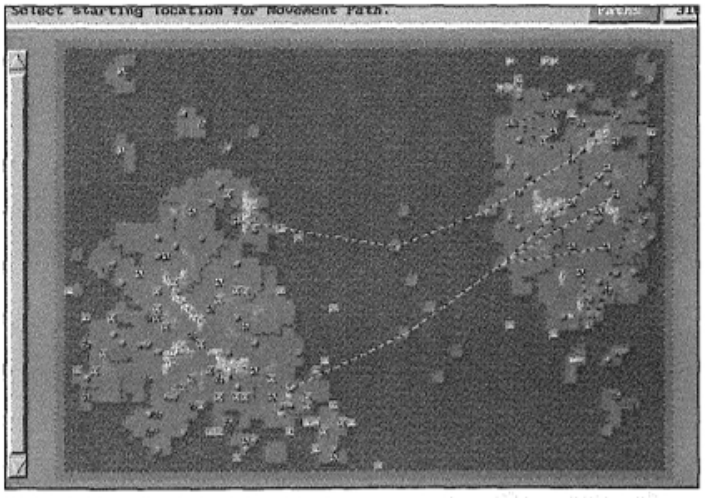


Figure 6.5 In the third tutorial scenario, the city of OUTER PORT became this player's prime assembly point as seen by the large number of paths leading to it.

To create a path, go to the Menu bar and, under Commands, select Paths mode (or simply press F8), then do a held-left-mouse-button click over the departure city. Drag the mouse to the destination city (or air base if it will be exclusively an air-unit path), and release the left mouse button. The Movement Path window will pop up, and you must then select which unit types you want to automate. As each unit of that type appears/arrives at the departure site, it will automatically be forwarded with a Go To movement order to the path's destination. Land, air, and sea units can all be toggled on and off separately or in any combination. Toggling them all off or drawing a path back to its destination point cancels a Movement Path command.

Don't create movement paths too early in the game. Make sure that you have established a safe rear area and know where the enemy is so that your paths will lead to the proper place along your front lines. Note that paths can also be daisy-chained from one city to the next. This is particularly useful for getting airplanes across a great distance by giving them several path *jumps* en route. Computer aficionados will know this as *daisy-chaining* paths together.

OTHER IMPORTANT MOVEMENT NOTES

Of course, there is more to movement than learning to use the various orders and commands. Following are several specific tips and reminders that cover various movement situa-

tions likely to crop up during a game of *Empire Deluxe*. Add them to your marching orders, and you will be able move your troops with the grace of Fred Astaire.

The Hand Is Quicker than the CPU

We have done this before, ourselves, and expect that it might happen to others also—therefore, consider this a friendly warning from one *Empire Deluxe* player to another. Occasionally, we'll press the keys on the numeric keypad faster than the computer's CPU (i.e., Central Processing Unit, or *brain*) can actually move the units. This usually occurs when we issue two quick-movement keystrokes to a unit that only has one move left.

For example, let's say that you've sent a ship out on a long Go To command. It reaches the end of its orders after spending one of its two moves for that turn. In haste, you fail to read the Information bar (which tells you that it only has one move left) and you make two, solid clicks on the numeric keypad thinking, naturally, that ships move two spaces. Well, not *this* one—not this turn, anyhow.

What happens here is that your second keystroke, which cannot be used by the ship in this example, gets applied to whatever unit happened to be moving next. While this might not cause that poor next unit a problem, it could lead to its inadvertent destruction or any of several other annoyances.

Therefore, keep an eye on the Information bar. Use your head when moving injured ships and tanks (which only move one square per turn). Have patience when unloading troops from a transport (where there is a slight delay before the next unit on board starts to blink). Don't be so quick to press multiple keystrokes on the numeric pad all at once. Like we had to, you must learn patience.

Past the Point of No Return

We all make mistakes and send air units out beyond their safe return range (see the previous example for a good reason why). When this happens, try to make the most of any moves remaining for that unit's now one-way trip. Use every last drop of fuel they have for either deep exploration or launching a kamikaze attack on the enemy. Wimping back only to crash near a friendly air base doubles the waste of these doomed air units.

Tanks a Little and No Tanks

This is just a quick reminder that armor units spend all their moves to enter rough, river, and forest terrain (the latter two may provide them better defense, however, if attacked while on that terrain). They are completely prohibited from moving into (but not attacking) mountain squares. Naturally, you'll want to plan their movement through clear squares, when it needs to be swift, and through forests (and, to a lesser degree, rivers) when it needs to be safe.

Infantry should avoid clear terrain when not trying to build air bases. Rugged-terrain squares do not slow infantry movement and usually provide a defensive bonus. Such a bonus can be in the form of combat modifiers; it is at least the requirement that an armor unit spend its entire move just to attack there. Also, coastal squares should be either avoided or followed, depending on whether enemy cruisers/battleships or transports are expected to be encountered.

Terrain has no effect on either movement or combat when playing by the Basic or Standard Game rules.

Whither Now? Show Me the Route!

When moving a unit multiple squares with a Go To command, you might be curious as to exactly what route it will take to get to its destination. After all, whether the unit goes one way or another around a given obstacle could mean the difference between life and death for that unit.

To see a unit's automated movement route is simple. When using the mouse for a click-and-drag Go To command, don't let go of the left mouse button when the cursor is over the destination square. Instead, hold down the right mouse button as well. With both mouse buttons thus held down, an information (cross-hairs) cursor will appear on the unit's present location and move, square by square, to the destination you've chosen. This shows the unit's computer-determined movement route (which takes effect when you let go of the mouse buttons). Letting go of just the right mouse button, at this point, will take you back to the click-and-drag Go To command, allowing you an opportunity to reconsider that move in light of this new information.

Note that this show-me-the-route trick does not work over undiscovered squares. Rather than moving around the obstacles that might be under cover of darkness, the computer will simply show you a pattern of straight lines through it. Sorry, but you can't cheat any free intelligence out of the computer that way!

The Anal-Retentive Air Base

Air units, you will have noticed, end their move when they touch a base (city, air base, or aircraft carrier). Thus, when staging air units from one base to another, it is most efficient to have them land while expending their *last* move for that turn.

To maximize the distances covered over time, players who like to set up path moves to stage airplanes built in the rear should consider building optimally placed air bases to send them (or *stage* them) through. Placing them at 12-square intervals generally works out very well, because fighters will thus reach an air base in exactly two moves while bombers will in exactly three. By working out the optimal locations for air bases that will be used to stage new air units to the front, perhaps a turn or two can be shaved off their arrival time. When multiplied over many air units, it can make a considerable difference on the battlefield over time.

INTERACTION POINTS (PORTS/LAND CROSSINGS)

Certain key terrain features can serve as interaction points between land and sea units during play. It is important that special notice be made of these and attention paid to the movement and combat challenges they might present. They include ports, diagonal land/sea passages and "canal" ports. These strategic land features will be discussed in detail in Chapter 9, because these are primarily combat arenas due to their restricted movement access.

THE LAST MOVE

Thus endeth the lesson. From the previous chapter you should have all the dirt on worlds and terrain. From this chapter you now know how to get around those worlds and their terrain. In the next chapter we'll teach you how to look where you're going and, more important, how to keep an eye on the enemy. Yes, there are still discoveries to be made, and turning the page will begin a most revealing chapter.

Inky Duty: Discovering the Map and Sighting the Enemy

Finding your way around the map and suddenly encountering enemy pieces are two exciting and absorbing elements in *Empire Deluxe*. In this chapter, we'll tell you how to remove those blackened tiles covering up the map (a process we call *inky duty* after the task of removing those inky black squares while impersonating Jimmy Durante singing *Inka Dinka Doo*). Also, we will give you a clear look at sighting the enemy.

Before beginning, allow us to define some terminology used in this book. When black squares are replaced by map information, that is called *discovery*. When enemy units (and cities) are spotted, we call that *sighting*. Thus, the map is discovered and the enemy is sighted.

MAP DISCOVERY

Beginning in Chapter 3's second tutorial scenario, you realized that *Empire Deluxe* was not just a conquer-the-world–type of game. No, it is a discover-the-world-and-*then*-conquer-it–type of game! While the map begins completely revealed when playing by the Basic Game rules, as well as in some custom scenarios (see Chapter 14 for details on scenario building), most games you'll play will be by the Standard or Advanced Game rules and feature maps that must be discovered. Unlike the old *Empire* game, players will not know how many cities are actually on the map until they discover them all.

The mechanics of map discovery are remarkably simple. As units move around, they reveal the terrain in nearby squares. Think of the map

board as covered with black tiles that are removed as units come adjacent to them. When playing by the Standard Game rules, every unit and city will push the blackness back one square. As a unit moves into a square, all black squares next to it become revealed.

Fighters, bombers, air bases, and cities all have a discovery (and sighting) range of two squares out when playing by the Advanced Game rules. Because of this, you will quickly learn that airplanes are particularly well suited to serve as the eyes of your armed forces. However, this should not preclude you from sending out destroyers to scout the oceans far from home (i.e., beyond the range of friendly air operations).

Getting the "Big Picture"

Zooming the map between larger and smaller scales is important during play. By stepping back (as it were) and increasing the map scale, the entire map can be seen at a glance. This will tell you the general disposition of your forces and what areas of the map have yet to be discovered. Using the Zoom mode from the Display menu will allow you to select one of the five different zoom scales (as will pressing their respective hot keys, Alt 1 through Alt 5), as shown in Figures 7.1, 7.2, and 7.3.

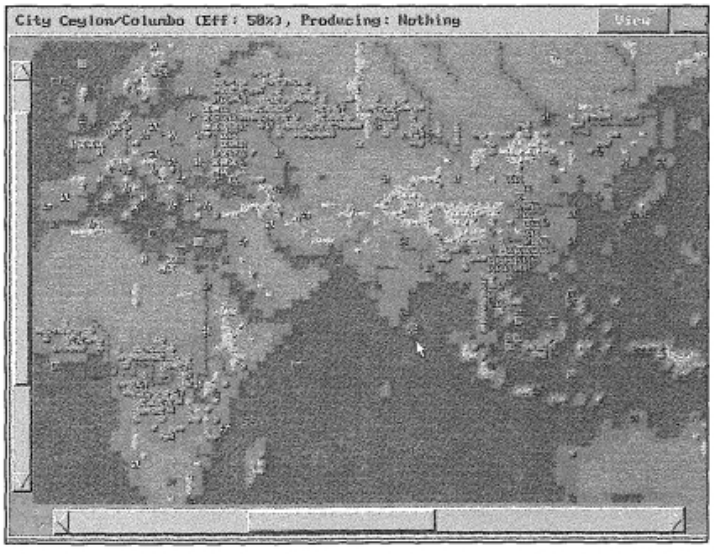


Figure 7.1 The World War II scenario map at 3x magnification

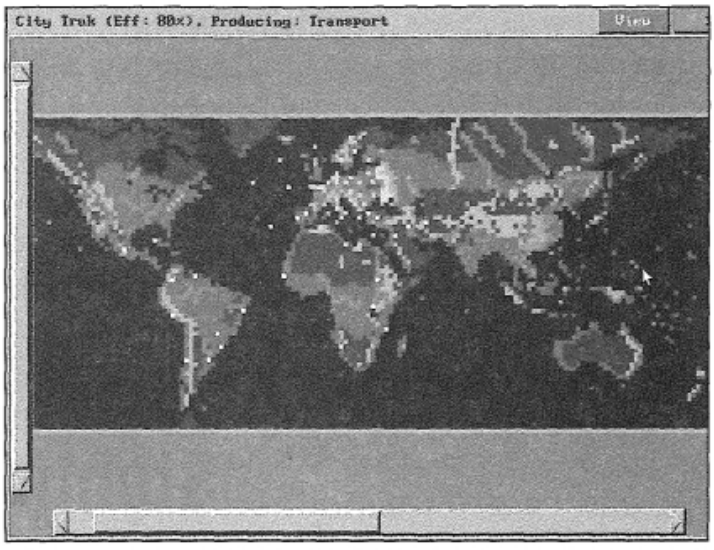


Figure 7.2 The same map at 4x magnification provides a strategic overview of the world.

Magnification 1x is the smallest scale (i.e., presents the largest looking icons and features) while magnification 5x is such a large scale that distinctions between unit types can only be ascertained by clicking on them and terrain resembles small colored squares. Although it is possible to play at the larger map scales, generally magnifications 2x and 3x work best in practice.

Altering the Screen mode is another way to bring game play into focus. This is thoroughly explained on page 79 of the manual, but we wanted to point out that Player 6's color will be brownish-orange (ochre) in 16-color mode and yellow in 256-color mode. (Ah, the limits of a 16-color palette.)

Finally, there is a neat trick to smooth map scrolling that we gave you at the end of Chapter 4. To remind you, instead of using the slider bars or the F1 - F4 keys, simply move the cursor to the edge or corner of the screen and hold

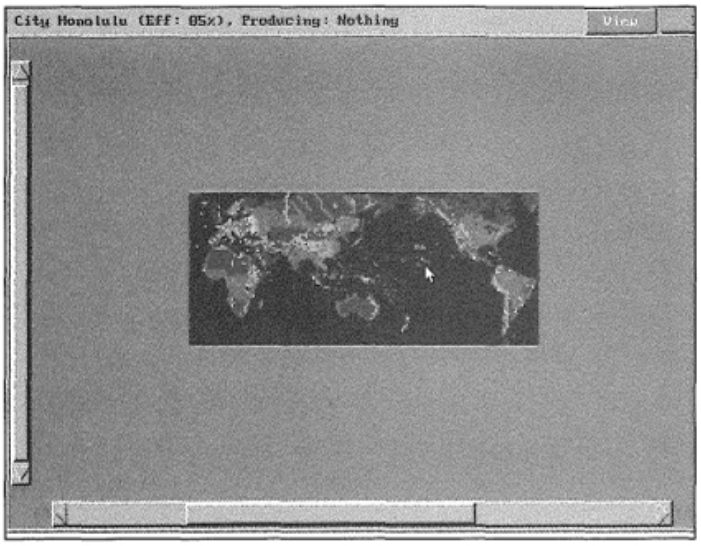


Figure 7.3 The 5x magnification

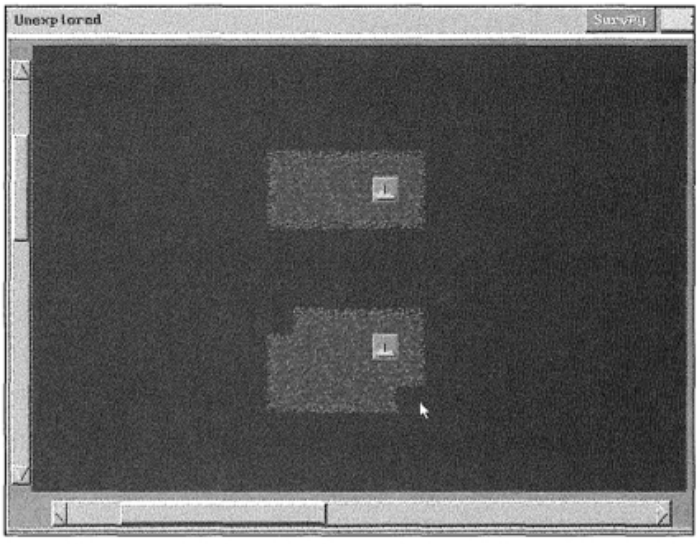


Figure 7.4 The two destroyers moved a single turn's three squares, but because the destroyer below moved three spaces in a zigzag pattern, it discovered more space than the one above.

down the left mouse button. The map will smoothly scroll in that direction (either up, down, left, right or diagonally). Centering the screen on the current active unit by using [C] works wonders, too. Use them both in conjunction, and you'll be hopping around the map like an expert in no time. These two techniques are great, and we recommend using them!

GOOD TECHNIQUES FOR EXPLORING "BY HAND"

Discovering the map is a function of movement. As you learned in the previous chapter, many moves can be automated by the various unit commands and orders. When a unit's exploration movement is automated, the computer's logic routines take over and it will discover the map in a reasonably intelligent fashion. When moving your pieces yourself (i.e., *by hand*), you must come up with your own intelligent movement routines. The following techniques will help you to make moves of discovery even more intelligent than those that the computer might have made for you.

Zigzagging

As you were taught in Chapter 3's second tutorial, when moving pieces by hand to discover the map along a straight line, have them move in a zigzag pattern to reveal more blackened squares. Note that fighters and bombers, with their two square sighting range, should zigzag a path two-squares wide in each direction, as shown in Figure 7.4.

Coasting Along

No exploration of a landmass is complete until it is thoroughly outlined. Whether explored by land, sea, or air, give priority to discovering every coastal square that a landmass possesses. Only then can you truly measure its size and the number and location of its ports, and, therefore, estimate the amount of time and number of forces it will take to capture it. Note that naval units can be given a special automated command that will cause them to outline the entire coastline of a continent (see below).

Bomber Exploration

Although slower moving than fighters, bombers have a longer range. A good technique, therefore, is to lead off your exploration from cities and air bases with fast working fighters. Use your bombers to follow up the fighter's discovery operations, extending them further into areas of interest, as shown in Figure 7.5. Alternately, you can send your airplanes on extremely long-range (one-way, suicide) discovery missions, if you feel the information they might gather could be worth their sacrifice.

Carriers and Fighters

When manually moving the fighters off a carrier there is one all-important rule to remember: *don't move the carrier away from the fighters*! If the carrier moves away, you may be positioning it so that the fighters will not have enough fuel to return to it. Thus, they'll find themselves moving on one-way, suicide missions.

If you find that this is one detail too many to pay attention to, try this rule of thumb: only move fighters one turn out from their carrier and order them to Go Home on their second move. In this way, although you are limiting the range from which your carriers will project their air power, you will not have any unnecessary fighter losses due to negligent moving of your carriers.

Better still, simply give a carrier's fighters fixed patrol patterns radiating from the carrier and send that carrier off into the blackness. The fighters will sight and discover anything within range as they fly by it, with the exception of submarines. It won't be the longest range discovery that the fighters can do, but it is much, much safer.

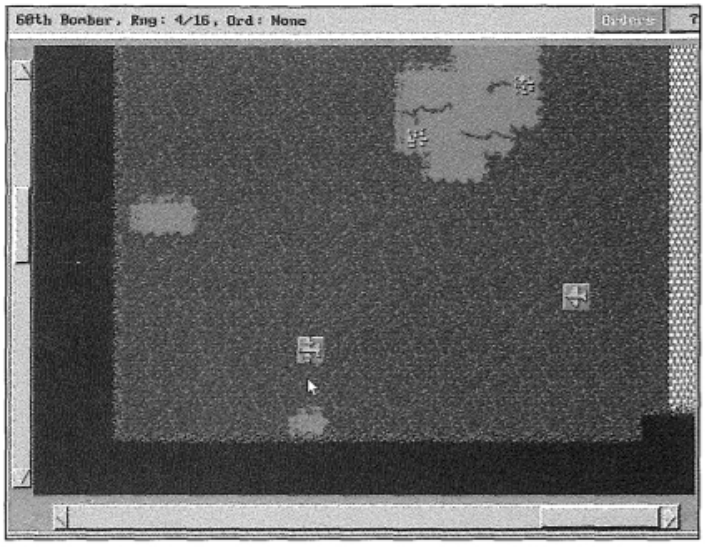


Figure 7.5 The land-based fighter discovered a single square of the landmass to the south, which could be the tip of a promising continent. The bomber now probes further over that landmass.

The Explorer's Lament

Whenever you're moving your units on a discovery mission, there is always the danger that they will end their turn at exactly the wrong place. Your bomber might use its last move only to sight a nearby enemy fighter, or your destroyer could wind up next to an enemy battleship. Well, they knew the job was dangerous when they took it, and so did you. While it's unfortunate when these things happen, they are the fortunes of war.

AUTOMATED EXPLORATION, LTD.

While most players enjoy the world discovery element of *Empire Deluxe*, not everyone wants to have to keep their attention focused on it when there are great campaigns underway. After the early part of the game is over and you are engaged in toe-to-toe combat with an enemy, you might feel that exploration has become something of a distraction. Some players are not as keen on the exploration aspect of the game to

begin with (or are simply lazy) and would rather let the computer handle it for them.

For these occasions, algorithms have been programmed into *Empire Deluxe* that allow players to delegate the duties of exploration to the computer. Here, we will tell you all about them, including many things the manual never did.

Using Auto Explore

Again, to remind you, the Auto Explore command ([X]) was introduced and stressed in the second and third tutorial scenarios, and touched on briefly in the last chapter. Using it allows the game's exploration algorithms to move a unit, game turn after game turn (in perpetuity). Automatic exploration will continue until there are no black squares nearby for that unit to discover or until a target for combat is visible. In either of these cases, the unit will then stop, blink, and request new orders.

The logic behind the way units move while following an Auto Explore command is that they head off toward the closest available black square first. If more than one such square is within the same proximity, the logic routine then decides which one has the most black squares next to it and heads for that one in preference to the others. If there is a tie for both shortest distance and number of adjacent black squares, the computer will choose randomly between them.

When Automatic Exploration Ends

Land and sea units will quit their Auto Explore commands when there are no further squares to discover on their landmass or nearby in their ocean (respectively). Aircraft, if they have no place left to explore from their present location, will check all bases (cities, carriers, and air bases) within their maximum transfer range (i.e., up to one long jump away) and select the most promising one (i.e., the one with the most nearby black squares) to transfer to. From there, they will continue to explore automatically. If such squares exist, they, too, will quit their automatic exploring and request new orders.

> Unfortunately, in the 3.0 version of *Empire Deluxe*, a human player's aircraft do not consider staging to air bases and aircraft carriers from which to conduct further automatic exploration. This is fixed in the 3.10 version of the game, described in Chapter 16.

Units also will quit auto exploring when they encounter targets that they can attack. These include enemy units or cities and, for land units, the discovery of neutral cities as well. Thus, even units moving trancelike under the spell of an Auto Explore command will become semi-awake (i.e., have the blinking gray background color described in the previous chapter) long enough to give you an opportunity to attack with them. Giving these half-awake units the Skip Move ([Spacebar]) order puts them right back on automatic exploration duty, however.

Auto-Explore Notes

Creatively lazy players who want to optimize their auto exploring should load up a carrier with several sleeping fighters on board. Send it to a blackened area of the map and then order the carrier and its fighters to Auto Explore the region. This reconnaissance team will discover huge tracts of unexplored squares at an amazing speed. The larger the world being played on, the more practical

becomes the Auto Explore command (and, also, using this aircraft-carrier technique).

Please note that the Auto Explore command is no panacea. The exploration algorithms that the computer uses to move units does not prioritize coastal exploration, for instance. Also, it will not prohibit planes from running out of fuel and crashing en route back to base. While this rarely happens (usually due to the plane needing to stack with another piece or neutral city—which is prohibited—so as to make it back to a base), we need to mention it so that you don't put your fist through the monitor when the planes you trusted to the computer to go auto exploring for you inadvertently crash and burn.

The Secret Ship/ Shore Discovery Technique

We have to thank Mark Baldwin for telling us a little trick that the Go To command routines allow players to do. We call it the Auto Explore Coastline command. It allows any ship to explore, completely and automatically, every coastal square surrounding a landmass. We discuss next how it works (and why).

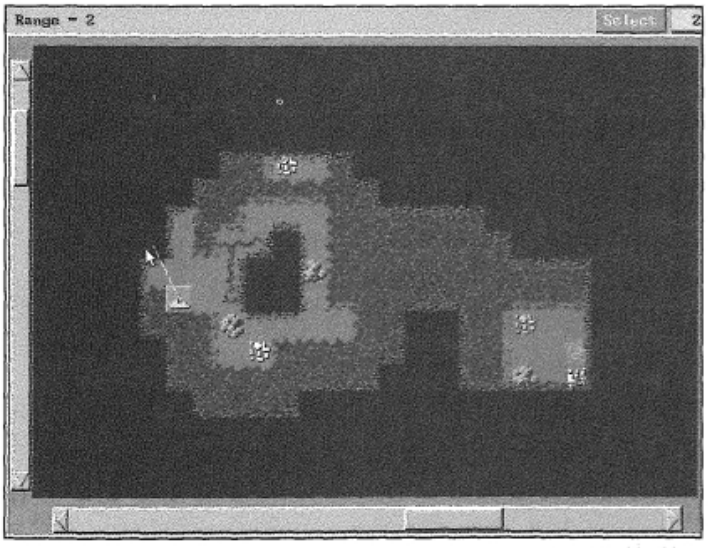


Figure 7.6 A unit receiving the Auto Explore Coastline command to a presumed land space

Order a ship to Go To a blackened square that you presume to be land, as shown in Figure 7.6. (These can be determined when a ship bumps into a newly discovered coastline.). That ship will then automatically loop around and probe every coastal square in search of a way to reach that land space until it exhausts all possibilities (usually after it outlines the entire continent). When it finally proves to itself by seeing that there is, in fact, no way for it to Go To the space you ordered it to, the ship will give up and asks for new orders, as shown in Figure 7.7.

This artificial Auto Explore Coastline command is a result of the movement routines trying desperately to find a way to carry out your (presumably) intelligent orders. The computer won't know any better until it can prove to itself otherwise. When a ship has completed your sly order, it will pause for a moment and calculate the continent's coastline again to make sure that there is absolutely no way to carry it out. After that, the warning sound will go off and you'll be asked to issue that ship new orders.

One word of caution when using this to explore enemy shorelines. Computer players, in

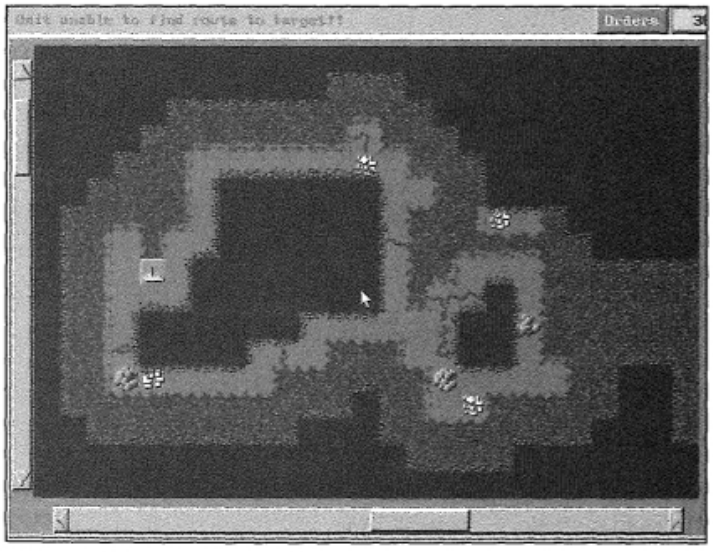


Figure 7.7 Bingo! A few turns later, the destroyer has exhausted all possibilities, and the player is told as much on the Information bar, as the ship awaits new orders.

particular, keep many land units near the shore (especially in their ports). A ship performing this undocumented mission may well end up receiving a lot of fire from enemy land units and, ultimately, being sunk by them. Therefore, you'd better consider ships performing this mission around enemy continents to be expendable.

TARGET SIGHTINGS

Under the Basic Game rules of *Empire Deluxe*, the map and all units are plainly visible throughout the game. Certain custom scenarios also use that criterion while others (just as most of those included with the game) are played with a visible map where enemy units (and cities) remain unrevealed until sighted. Under the Standard and Advanced Game rules (and in some custom scenarios), of course, neither the map nor enemy positions begin revealed.

Thus, even when playing custom scenarios, sighting "targets" will be a primary concern for *Empire Deluxe* players. Let's begin by defining terms. Anything that your units can combat is a target. Therefore, targets include enemy and neutral cities, plus enemy units (including air bases). In *Empire Deluxe*, what you can't see can't kill you, but it can sure sneak up on you fast before revealing itself (and *then* it can kill you)! In this section we will examine target sightings, deal with old information, and give you a few tips that can help you develop good target sighting habits.

How Targets Are Sighted

Targets are sighted when you move near them. All units in a Standard Game will only sight targets that are next to them. When playing under the Advanced Game rules, land and sea units will only sight targets that are adjacent to them while air units, air bases, and cities sight targets at a range of two squares. Thus, you will notice that when a land unit captures a city, that new city looks around and the map is immediately updated with any new information from its long-range (two-square) scan.

There are a few very important exceptions: First, while air units can see out two squares, land and sea units will also see them at the same two-square distance. Thus, when scouting with airplanes, units that you can see can see you. Second, submarines cannot see adjacent enemy land units or air units and won't know that there is an enemy air unit adjacent unless they accidentally try to move into its square (which instantly causes a battle between them).

Finally, submarines can only be seen by adjacent destroyers, cities, and cruisers. Other ship types and airplanes will only discover a submarine if they happen to move into its square (again, instantly causing a battle between them). Therefore, even a dense air patrol net can often miss a submarine passing near it.

How Long Targets Remain Sighted

Last turn's new sighting report becomes this turn's old sighting report. Old sighting reports are distinctive for having an enemy's unit symbol in its proper color while its background becomes black, as shown in Figure 7.8. When that square is sighted again on a later turn, its information is updated. Consequently, the old unit sighting report disappears and is replaced by new, accurate information (usually indicating that the enemy has moved). If not rechecked, old sighting reports disappear automatically in three turns.

The exception to old sighting reports disappearing is when enemy cities are discovered. They will remain the color discovered (and report the last known production underway

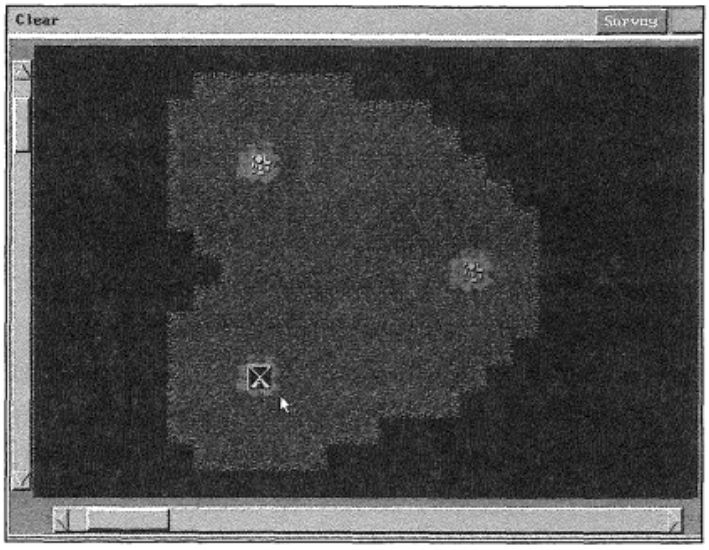


Figure 7.8 A discovered enemy city and old unit sighting

there) forever. This information is only updated by going back and getting fresh sighting information on that city again. Cities have a tendency to change owners, production, and production efficiency, so checking them occasionally will keep your information about them accurate enough to be useful.

In Figure 7.8, the purple player (whose city is on the right) has discovered the light blue city (on the top) and an infantry unit a couple of turns ago. Since these are old sighting reports, the background of the infantry unit is now black. If not checked again soon, the old unit sighting report will disappear. Note that, meanwhile, the infantry unit could have done any of several things: remained, been removed, converted itself into an air base, been disbanded, or even been destroyed by a third player.

GOOD SIGHTING HABITS

Just as there were good discovery habits for you to learn, so, too, there are good sighting habits to acquire. Remember, the purpose of aggressively sighting and keeping your eyes out for the enemy is so that they will not surprise you. If you know where the enemy is, you can react to him. Therefore, constant, up-to-date information as to the enemy's strength and position must be maintained so that you can make sound strategic decisions. (These decisions, by the way, are the subject of the next chapter.)

Reconnaissance vs. Attack

When you are using an airplane to sight enemy units or discover the map, there may come a time when it will encounter a large group of enemy forces. Although it is tempting to attack them with your scout, do not.

Use scouts for information gathering, not for combat. They will have enough problems surviving enemy attacks against them. Therefore, always strive to have them end their move not in the midst of units who will attack them, but in as safe a square as can be found nearby. Do not compound your scouts' chances for destruction by attacking with them.

The same is true for destroyers, feeling their way through the blackened waters of discovery, a long way from a home port to repair at. Except for possibly attacking an isolated enemy transport, do not engage the enemy. If your scout ship discovers an enemy naval combat force that must be engaged, mobilize your own forces and engage it (but not with the scout). The information that your scouts provide is too valuable to throw them away lightly. Do not risk your scouts—protect them!

Specifically, when searching by air near suspected enemy ships, try to end the airplane's move over land. When scouting over a landmass, try to end the scout's move more than two squares from a city (so that any armor hiding

there doesn't come out and shoot it down) or, better still, over some coastal water. Consider not spending a destroyer's third movement point on exploration duties when the destroyer is in unknown waters. Instead, it should either use that point to flee from enemy ships and coastlines or simply skip that move entirely so that it doesn't end its turn in one of these disadvantageous positions.

The Unequal Sighting-Range Advantage

In the Advanced Game of *Empire Deluxe*, cities and air bases can see two squares away. Because infantry armies, armor, transports, destroyers, cruisers, battleships, and carriers (without fighters on board) can only see out one square, cities and air bases have a sighting-range advantage.

When your city or air base observes these units two squares away, as shown in Figure 7.9, you will see them but they will not see you. If you are prepared, an immediate surprise attack can be launched against the unsuspecting enemy (and *should* be launched against their transports in particular, see Chapter 9).

In Figure 7.9, light blue air bases are strategically located to monitor the southern cape, and the purple units are under observation. Fortunately for light blue, he has a counterattack force prepared to deal with this threat. If this situation were observed from purple's perspective, no enemy units at all could be seen. When light blue counterattacks, purple will not be expecting it. Thus, light blue is making the most of his unequal sighting-range advantage.

Also, there are advantages and disadvantages to building air bases next to the ocean. While they extends the ability to see further

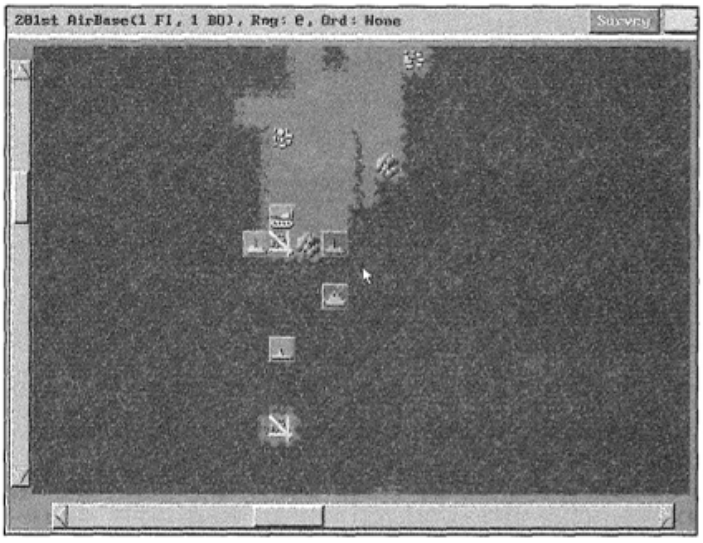


Figure 7.9 An invasion being watched

across the sea, coastal air bases are very vulnerable to shore bombardment from cruisers and battleships. Cautious players may build their air bases one square inland to avoid enemy naval bombardment. Prepared players will keep land units nearby to replace lost air bases quickly. Finally, avoid placing yourself at a sighting-range disadvantage when approaching enemy cities and air bases. Use scouts to keep you informed and protect your land units and transports as they close in on the enemy's cities and air bases (see Chapter 9).

Boot and Scoot Land Exploration

When a transport carrying land units first discovers a new landmass, consider unloading the land units even when no city has yet been spotted there. The land units can begin exploring the interior of the island while the transport works its way around the coast. If no cities are found there, the land units can again embark on the transport and continue their voyage. This will not only allow for a thorough discovery of the landmass, but if your transport is sunk by a sur-

prise attack in the meantime, at least the land units will already be safely ashore.

The Recon Report Replay

If you didn't study the monitor closely while the other players conducted their turns, you may have missed one of their units moving past one of yours. If you missed watching the enemy's move for whatever reason, be sure to order a Recon Report. It will show you a replay of enemy troop movements that occurred within your units' sighting range. Note that this passive sighting of enemy units during the other player's turn will temporarily wake up any units under sentry orders that sight them. (This should serve as another clue that there are enemies about. Hitting Spacebar will reassert these units' previous orders.)

Similarly, to stay current on any battles that may have occurred while you were in the bathroom or distracted by a phone call, the Combat Report will bring you up to date as to what the enemies have done to you during their last turn. As you would the Recon Report, you should study it closely before beginning your turn, particularly when playing by electronic mail (see Chapter 12).

SPYING

In *Empire Deluxe*, occasionally specific information about enemy assets can be garnered beyond their mere location and type. Obtaining an enemy city's production efficiency or finding out what unit type it is currently building is more valuable than just knowing where the city is and who owns it. Likewise, seeing an enemy battleship is one thing; knowing the extent of damage you have inflicted on it previously is even better (see the following). Keep spying and keep your sighting reports updated.

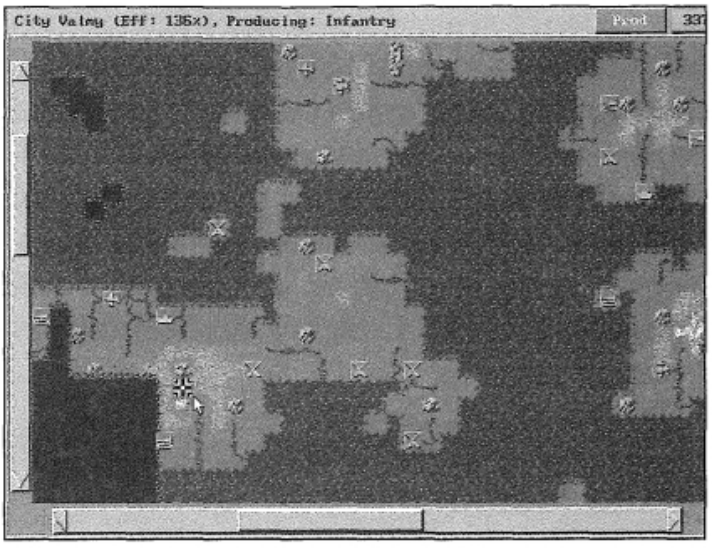


Figure 7.10 A Production Map showing the production of two players

Industrial Espionage

You have been advised that every few turns you should open the Production Map and consider your total economic situation. No doubt you have noticed that any enemy cities you may have discovered also appear on your Production Map, complete with icons for the units they're producing, as shown in Figure 7.10. Consider this the "big picture" of industrial espionage.

In this figure, brown (the units along the top and right and at the center of the map) is making inroads onto green's continent, and driving westward. The brown player calls up his Production Map that shows where both brown's and green's units are being produced (those are shown in the lower-left corner and under the cursor). Notice that by moving the cursor over the green city of VALMY its efficiency appears on the Information bar. The brown player makes a mental note to assign priority to attacking green's efficient, land-unit producing cities.

The method for quickly spying on a single enemy city is to click the right mouse button on it and read the Information bar. Double-clicking

the left mouse button will open its pop-up window, but a single right-mouse-button click gives all of the information you really need. Knowing which is the better city to attack will help you prioritize your target selections. Be sure to get occasional fresh sighting information on known enemy cities to see if their status has changed. They may have changed their production, production efficiency, or even owners.

Is That Enemy Ship Crippled?

Unfortunately, when an enemy ship (or armor unit) is simply queried by a right-mouse-button click, no information as to its damage status (or cargo, if a transport or carrier) will be presented. If the action that damaged the enemy unit was recent, however, there are two possible ways by which you can be reminded of their damage status, as discussed next.

If the enemy ship suffered damage attacking you during its turn, you can call up the Combat Report and watch it kill your unit(s) all over again. By keeping your eye on the Information bar, you will see how much damage you inflicted on the enemy before dying.

If the enemy ship suffered damage from a very recent attack of yours, requesting Prior Message from the Display menu (or simply pressing [-]) will scroll backwards through the last three messages that appeared on the Information bar since your turn began. Other than these two short-term memory options, you will simply have to remember approximately how much damage enemy units might be limping around with.

These recall methods will also prove themselves useful after you have just sunk an enemy transport or aircraft carrier. In case you missed it on the Information bar the first time, a refresher look will tell you how many units were on board and destroyed when the enemy's ship sank (although, in the case of transports, it will not tell you how many of which land unit type they were).

Always pay close attention to the text that appears after a battle on the Information bar! It is your single best intelligence source throughout the game, so consider slowing down your Message Speed when configuring the game.

THE FINAL FRONTIER

This chapter, and the previous two, answered many "what" and "how" questions about the map and units and where to move them. In the next chapter, we will delve into the philosophy of effective, winning play in *Empire Deluxe*; in other words, we will answer the "whys" with wise answers. By a study of the nine principles of war, along with the specific tips presented in the next chapter, the strategic puzzles in *Empire Deluxe* will be much easier for you to solve correctly.

Winning Wars: The Nine Principles of War

This chapter focuses on strategy and how to win the wars in *Empire Deluxe*. Strategy covers the larger and broader elements of planning. Conversely, the smaller and more detailed aspects of military planning are considered "tactics" (and are examined in the next chapter). In terms of strategy, there have evolved over the ages nine generally accepted *principles of war*. A successful military operation, whether strategic or tactical in nature, relies on them for its success.

You will learn these nine principles of war and, where applicable, be shown the techniques for applying each of them to your play of *Empire Deluxe*. First, however, we will examine the criteria for winning and advancing through the ranks of your personal *Empire Deluxe* player history. Once you know what constitutes winning and what your rewards are, we'll show you how to obtain more victories.

WINNING (BY DEFINITION)

Winning a game of *Empire Deluxe* entails being the last one standing when the shooting stops. This simple victory condition—sole survivorship—usually requires a fight to the finish.

Your ultimate reward is to see the victory screen shown in Figure 8.1 and hear the musical fanfare celebrating your triumph. Interestingly, the officer on the right bares a striking resemblance to *Empire Deluxe* designer Mark Baldwin. Note that this is also the officer standing in the lower-right corner of the Main menu screen. (That Mark gets around, doesn't he?)

Players (both human and computer) can offer their resignation. Resigning players, naturally, lose. For whatever reason, at any time during a human player's turn, he can resign by selecting Resign from the File

Figure 8.1 Victory screen shot

menu. When a human player resigns, his opponents have no choice but to accept it. When a computer player resigns, you can refuse and fight on until the bitter end.

Note: Cheaters who do not want losses on their permanent record can save the game as CHEAT.SVG and start a new one or simply reset the computer instead of resigning. Either of these methods will leave your win/loss record unsullied and may prove particularly useful early on in a game in which your starting position looks either uninteresting or particularly disadvantageous.

What Makes a Computer Player Resign?

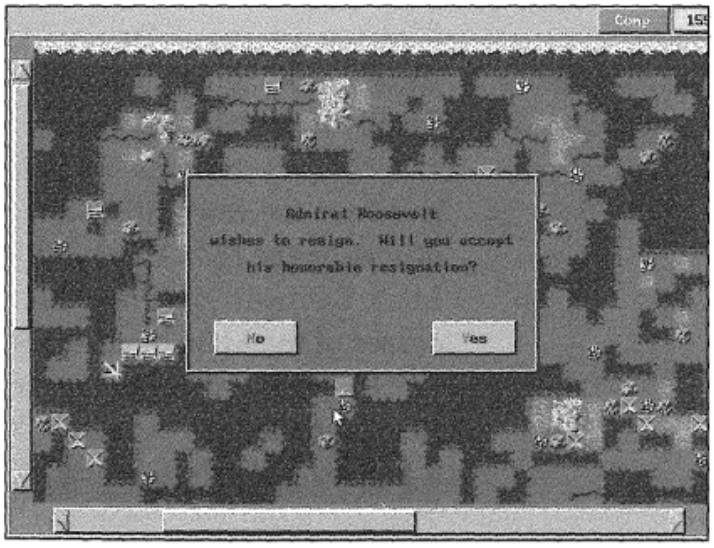
Computer players are tenacious and do not resign easily. Table 8.1 gives a list of all the criteria that must be met before a computer player will hoist the white flag of surrender.

If you refuse a computer player's surrender, it won't fight any harder or remember it and hate you for the rest of your life. It's just not a very honorable thing to do, that's all. Why crush an obviously vanquished opponent into the dust when you could enjoy all of the challenges that await you by starting a new game?

TABLE 8.1: COMPUTER PLAYER SURRENDER CRITERIA

1. There is only one human player remaining.
2. There is only one computer player remaining.
3. The computer player's information shows that the human player controls over half of the cities it (the computer player) knows.
4. The computer player's information shows that the human player has a three-to-one ratio of his cities to the computer player's cities.
5. The computer player hasn't previously offered a surrender that has been rejected during this game (i.e., once refused, a surrender will never be offered again and you must fight to the bitter end).

For those who wish to stick their sabre into the back of a computer player and fight him to the finish (which must be done with all but the



last remaining computer player, in any case), it won't be easy. They won't quit until there is physically no way left for them to capture a city. Once you eliminate their last land unit (including those on transports) and their last city, they will resign.

Rising Through the Ranks of Player Promotions

After some victories, you will receive a promotion to a higher rank, as shown in Figure 8.2. The number of victories between promotions varies and is explained in Table 8.2, below.

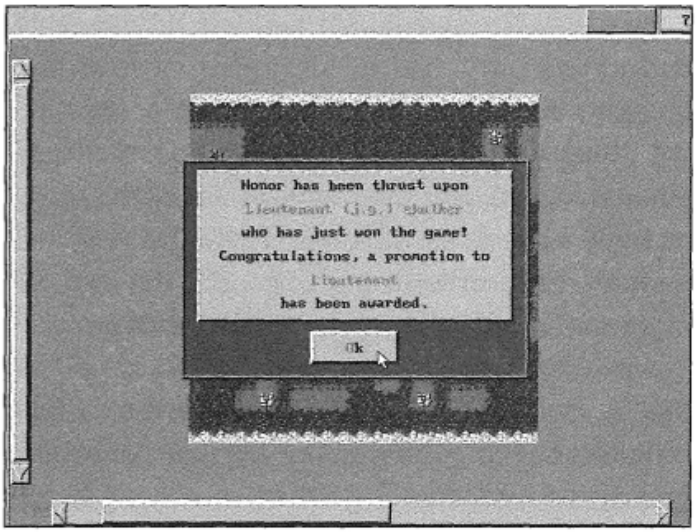


Figure 8.2 A promotion to a higher rank

TABLE 8.2: PLAYER-RANK TABLE

POINTS EARNED	NAVY RANK	ARMY RANK
0	Ensign	2nd Lieutenant
5	Lieutenant (j.g.)	1st Lieutenant
25	Lieutenant	Captain
100	Lieutenant Commander	Major
400	Commander	Lieutenant Colonel
1,000	Captain	Colonel
3,000	Rear Admiral (l.h.)	Brigadier General
8,000	Rear Admiral (u.h.)	Major General
18,000	Vice Admiral	Lieutenant General
36,000	Admiral	General
62,000	Fleet Admiral	General of the Army

Notes:
j.g. = junior grade
l.h. = lower half
u.h. = upper half

Player rank has absolutely no effect on the game and exists only for the purposes of personal bragging rights.

When you first entered your name, the computer assigned you randomly to either the army or navy branch of officers. Table 8.2 lists the various ranks in both branches and the number of *promotion points* you need to reach them.

Promotion points are earned every time you play a game to completion. A player earns five promotion points for winning (i.e., getting to the victory screen), two for losing in a fight to the finish, and one for resigning early. This is multiplied by the average skill level of all opponents at three for human or Expert, two for Standard, and one for Easy, plus one for every player in the game more than two.

For example, if you lose in a game against one human, one expert computer player, one standard computer player and two easy ones, your score would be two (for losing) times the total of (3 + 3 + 2 + 1 + 1)/5 = 2 (the average opponent player skill, determined by adding their numbers together and dividing by the total number of opponents) plus 4 (one for every player in the game, including yourself, more than two). This works out to 2 x (2 + 4) = 12 points.

I just wanted a simple, clean promotion system without a lot of variables to check. This one seems to work well.

—Mark Baldwin

Thus, the worst you can do is resign to a single, easy opponent. However, this will still garner a single promotion point (1 x (1 + 0) = 1). The best you can hope for is to beat five other human and/or expert computer players in a six-sided contest, which earns 35 points (5 x (3 + 4) = 35). Even at the rate of 35 points per victory, it will take 1,772 victories for you to reach the highest rank. Once there, you do not switch branches and start over again. Instead, it is time to retire your old player name and start building up a new one.

> Interestingly, *Empire Deluxe* does not keep track of the Average Difficulty level on the player's history. The old *Empire* game did in its Commander's Log.

Note that neither the game level played, any human opponents' ranks (if they resigned or were ground into the dust), the map size (whether it wrapped or not), the number of turns it took to decide the game, the forces-lost ratio, the number of handicaps you suffered and overcame (or made your opponents suffer), nor the advantages you or your opponents enjoyed (see Chapter 16) will modify your promotion-point earnings. Also, you cannot check your current accumulated score (you just have to press on until you reach the next promotion level).

All of this information is stored on the EDPLYR.HST file in the EMPIRE\DATA subdirectory. If you ever remove your game from your hard drive and want to save your long-fought-for-record, be sure to copy this file and replace it when you re-install the game.

The Post-Mortem Map

When a game ends, you are taken back to the map screen for a final look at the end-game situation. A click of the right mouse button anywhere on the map will open the pop-up window, shown in Figure 8.3. It offers you a chance to view the world from different perspectives.

If you decide to see a different view of the world at the game's end, a Map View Selection menu will follow and give you a selection to choose from as shown in Figure 8.4. There will

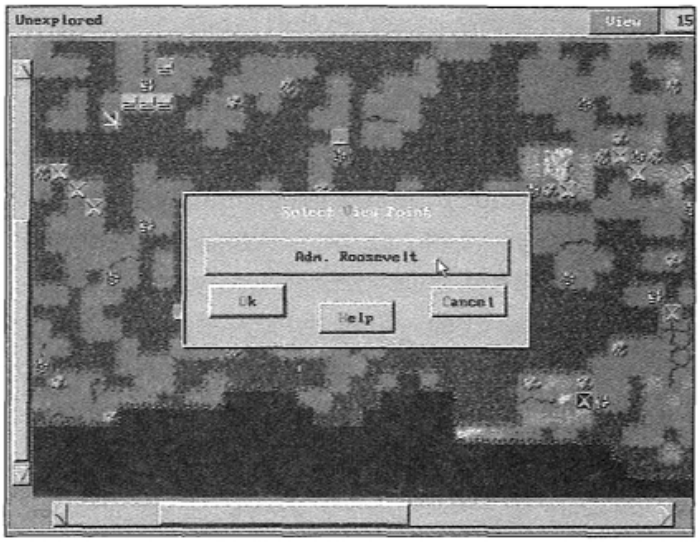


Figure 8.3 A special Map Survey mode allowing different player points of view

be a separate view for each player in the game, plus a world view that reveals all of the black squares and places all of the units on the map. You may want to take the opportunity to find out what your opponents' final dispositions were (i.e., what they were producing and where they were headed when the game ended). Sadly, there is no complete game history or film that you can study in order to see how events unfolded from all sides from the beginning of the game to its conclusion.

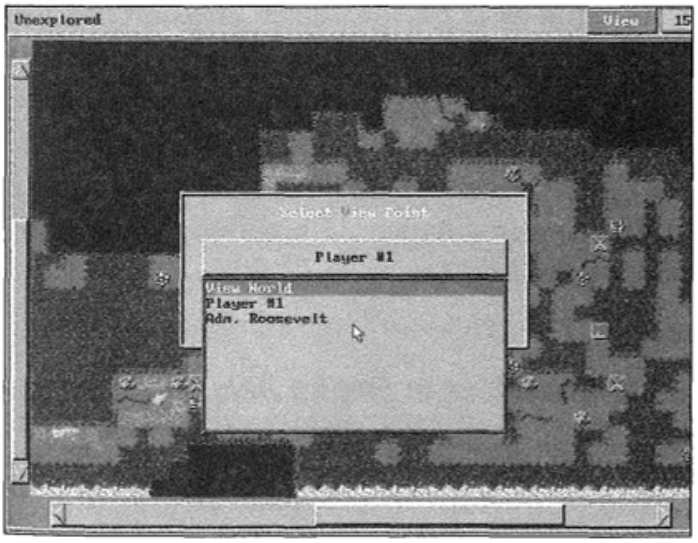


Figure 8.4 Map View Selection menu

THE NINE PRINCIPLES OF WAR

Empire Deluxe is a strategy/war game. Therefore, sound military principles can be applied to formulate a winning game plan. In *Empire Deluxe*, as in life, those who remain focused on their goals are far more likely to achieve them. Those who lose their focus or, worse yet, do not have clear goals, cannot hope to obtain them.

War is madness, but there is a method to it. The method of winning is summed up in the nine principles of war, discussed below.

Principle 1: Objective

Every military operation must be directed toward a decisive, obtainable goal. That goal is the *objective*. Naturally, the overall objective is to win the game.

While winning the game is your final destination, you should set many other intermediate goals along the way. These objectives will be your stepping stones along the treacherous path to victory. Obtaining your intermediate goals ultimately makes your final goal obtainable.

According to Sun-Tzu, the great Chinese military philosopher whose book *The Art of War* has passed his wisdom down through the centuries, armies require *energy* to be victorious. He refers to human energy—that spent by the troops when they march or fight, and that spent by commanders when they plan and organize.

There is nothing about your troops' energy in *Empire Deluxe* that will concern you. They can march and fight forever without fatigue or emotion until they die. It is your own energy, as their commander, that must be spent wisely. Without clear objectives along your path to victory, your energy will be wasted on the many unimportant goals that you can obtain rather than the few important ones that you *should* obtain.

City Objectives in *Empire Deluxe*

Since *Empire Deluxe* is ultimately won or lost based on the control of cities, each city becomes an important intermediate objective. However, every city has its own unique gravity as a military objective. Some will be easier to take. Some will be easier to defend. Some will be more advantageous to own. Ideally, you will give priority to cities that have all three of these characteristics:

- Cities that are easy to take include neutral cities and cities that can be isolated from defending troops and, therefore, are not subject to immediate counterattack. Although they will fight as hard as other cities (exception: not in the 3.10 version of the game—see Chapter 16), since there are no enemy units nearby to contest your capture of them, they are considered easier to take. A city that is the only one on its landmass, too, is generally easy to take.
- Cities that are easy to defend are those on a landmass with several other friendly-controlled cities. The other cities, when pressed, can usually build the forces needed to retake a single city on that landmass without requiring assistance from other areas. Cities are also easy to defend when they are not isolated from your strength (i.e., when your forces are nearby and can reach them quickly and easily).
- Cities that are advantageous to own come in many varieties and have considerable gravity as objectives. Cities that are advantageous to own include the following:
  1. The first city conquered on a landmass that has several other cities on it is extremely advantageous. This city is important because you can expand from it by building land units to conquer the remaining cities on that landmass, and simply marching directly overland.
  2. Port cities are valuable, but they, too, have priorities. The first port captured on a landmass should face your rear areas so that you can reinforce it rapidly, if necessary. Port cities near where you are fighting the enemy (regardless of where the cities are facing) are the next most important. Finally, ports that properly face an ocean where you wish to project your power are particularly advantageous.
  3. Cities that guard important interaction points, such as canal ports that connect two great landmasses and oceans together, are extremely advantageous to own. (These cities will be analyzed in the next chapter.)
  4. Cities that provide strategically located air bases (for staging airplanes to the front, or for patrols and combat missions) or repair facilities for crippled units near a battle zone are advantageous to own.
  5. Cities with relatively high production efficiencies (over 100 percent) or urgently needed production specialties are advantageous to own.

Weigh these criteria when choosing the cities that will be the focus of your energy. Cities are neither created nor placed equally, so weigh their importance carefully. Learn to find the advantageous cities and make those your priority objectives. We will give examples of city prioritizing in Chapter 11's review of the third tutorial scenario.

Other Objectives in *Empire Deluxe*

There are other good objectives that can be set in *Empire Deluxe*. They include, but are not limited to, the following:

- Hunting down enemy transports with great vigor. Transports are usually the bottleneck in enemy operations and, therefore, often his most vulnerable point. Also, when destroying a transport, you get the added value of destroying their passengers cheaply. As has been said before and will be stressed again in the next chapter, sinking enemy transports and protecting your own is a crucial key to victory in *Empire Deluxe*.
- Sweeping the enemy out of certain stretches of ocean to secure the safe passage of your transports to the front. This will require some destroyers and cruisers to keep a lookout for enemy submarines.
- When you can, concentrating on eliminating the player that troubles you the most. If no other player is troubling you, attack the opponent you determine is the weakest one you face, and eliminate him first. (We will discuss why a little later on.) Determine an enemy's strength or weakness by the number of their units and cities that you have sighted, the known production efficiency of those cities, the terrain they will be defending, plus the skill, handicaps, and advantages that that opponent possesses.
- Engaging only one enemy at a time (if possible). Your energy is most efficiently spent when it is concentrated on fighting a single opponent and a single objective. While not always possible, it is desirable. See Chapter 15's discussion of the computer player's *hate index*, or Chapter 13's discussion of diplomacy with other human players, for some clues to solving this dilemma.
- When multiple human players are involved, seeking to build your alliances while destroying your enemy's. (See Chapter 13 for some diplomatic tips.)
- Controlling the center of the map, which allows you to move in the greatest number of directions. However, the center of the map is also the hot seat since enemies can come at you from every direction. Controlling the edge of a map affords you greater security. Early on, it is best to secure a map edge or, better still if the map does not wrap, a corner, so that you will have a safe rearward area to expand from. Operating along a map edge always gives you a secure flank. Only after you have a secure rear area should you consider holding the center of the map and attacking from it.

Principle 2: Offense

Only offensive action achieves decisive results. The best that defensive action alone can achieve is stalemate, which is not decisive. To win, you must take the offensive and move against the enemy.

It is simple reasoning that troops can be doing one of two things: they can either be waiting for something to happen or they can be making something happen. Generally speaking, if they are making something happen they are on the offensive. Conversely, if they are waiting for something to happen, they are on the defensive. We will examine both of these states, beginning with the offensive.

Taking the Offensive

Units on the offensive control the tempo of an engagement—in particular, when and where it will be fought. The benefit of the offensive is that it controls contact with the enemy.

Offensive activity seeks to find weaknesses in the enemy's defense. It also has the advantage

of refocusing the defender's attention and energy toward reacting to the attacker's actions. This reduces the defender's ability to be proactive and develop his own offensive plans.

Even when you have a smaller army facing a larger one, taking the offensive remains an important principle. By counterattacking where the strength of an enemy's army is absent, you may get him to worry about his own security. This threat from you, in turn, may divert his resources away from his own offensive against you.

The great drawback to conducting an offensive is that it takes energy—a *lot* of energy—to conduct one carefully. Offensives are tiring and expensive (both in energy and troops) by their very nature. Also, they can be confusing and distracting. If, for example, units are running around helter skelter—not cohesively moving toward a clearly defined objective—they can be defeated in detail by a defender that keeps a cool head and follows these military principles.

The Case for Defensive Operations

Now let us consider for a moment the other side of the coin, defensive warfare. Defense has two goals, both of which are the antithesis of offense.

The first defensive goal is to make an enemy's offensive action hazardous and costly. When the defender throws back an enemy offensive, inflicting heavy casualties in the process, he has succeeded. Likewise, when the defender forces an attacking army to do nothing because it would be too risky to either attack or bypass the defenders, he has also succeeded.

The second goal of defensive warfare is to provide a secure platform from which to conduct an offensive. Offensives do not spring up by themselves overnight. The mass of forces required to conduct an offensive must be built up over time behind the safety of a secure defense.

Knowing When to Attack and When to Defend

In the words of Sun-Tzu, "Defense is for times of insufficiency, attack is for times of surplus." As your empire expands and your forces divide into several concentrated groups, keep in mind that superiority and inferiority in strength is a *local* matter.

At the end of the third tutorial lesson, among the good habits you were to adopt was the habit of always taking a moment every 10–15 turns to step back and survey your situation. This is the time to reassess your strength versus your enemy's strength and see if you should shift from the defense to the offense or vice versa. We will discuss this in greater detail later on in this chapter.

In *Empire Deluxe*, there is another way to tell when it is a time of surplus: when the number of units you possess reduces your overall production efficiency (see Chapter 10), you have achieved a strategic surplus of strength. When this happens, employ it in offensive operations—wisely, according to these principles of war and the tactical lessons found in the next chapter.

As shown in Figure 8.5, for this player, it is a

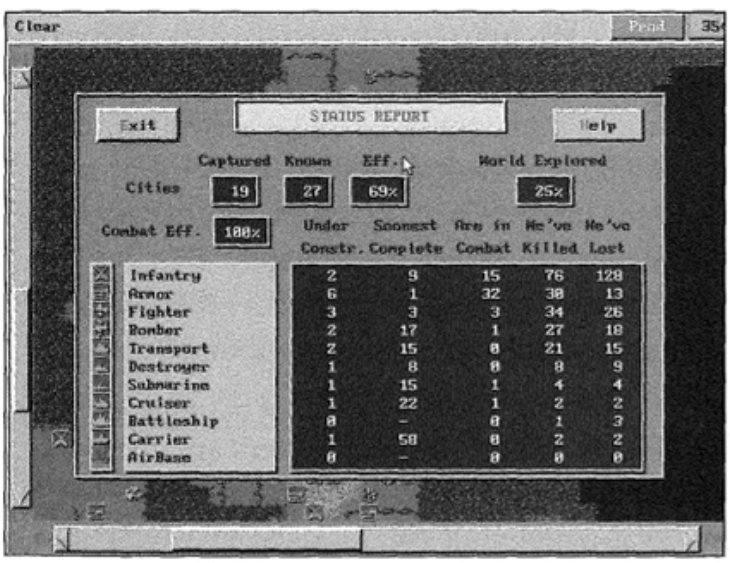


Figure 8.5 This Status Report shows a lowered overall production efficiency.

time of surplus. His production efficiency (marked by the mouse pointer) is reduced because of his great surplus of land units. He should attack, but cannot, as he currently has no transports in action to take his land units anywhere. (Transports are often a bottleneck, and you can never have enough of them.) Try to choke the enemy's bottleneck closed, as this figure illustrates. This will paralyze an enemy's ability to maneuver and force him on the defensive.

Principle 3: Simplicity

Simplicity must be the keynote of military operations. Fortunately, *Empire Deluxe* has reduced the many complexities of war into a simple, playable game format. Since you will always have the luxury of time to plan your maneuvers, your campaigns can be a bit more elaborate than when time is pressing you (as it does in real time games).

Simplicity in *Empire Deluxe* means to limit the amount of objectives that you are going after so that you can keep your energy focused. Deal with smaller problems first, so that they do not grow into large ones. There will be ample difficulties presented in the next chapter (on tactics), so try to keep your strategies clear and simple.

Another occasion to heed this principle in *Empire Deluxe* is when advising an ally how to marshal his forces. When communicating instructions for others to carry out, the simpler they are, the more likely they will be carried out as planned. Complex instructions are more likely to be misinterpreted or ignored. This will inevitably lead to disaster, so maintain the principle of simplicity when what you are thinking must be understood by others. It is amazing how many allies you will make who, seemingly, don't know the difference between left and right, front and back, attack and defend, or move and hold when you try to give them instructions. Therefore, always keep it simple.

Principle 4: Unity of Command

Napoleon Bonaparte recognized that "Nothing is so important in war as an undivided command." As with the principle of simplicity, however, achieving unity of command is seldom a problem in *Empire Deluxe*. As supreme leader of all your forces, you move them by your will alone with an absolute singleness of purpose.

As with simplicity, this principle applies when dealing with allies. Alliances are generally useful, but to be effective, one player's forces must be subordinate to the other's. Only when forces are supremely marshaled under a single mind can there be unity of command and a complete singleness of purpose. While you cannot directly move an ally's troops yourself, *someone* must command and coordinate your combined strategic efforts. Again, Napoleon commented, "It is better to have one bad general [in command] than two good ones." When you make alliances with others, unify the command for planning strategy under one of you to avoid the disasters that will inevitably befall a divided leadership. Leave the details and tactics for implementing your strategy, however, to your allies.

Principle 5: Mass

To concentrate the maximum available combat power and apply it at the point of decision is to achieve the principle of mass. Particularly in a game like *Empire Deluxe*, where (assuming there are no player combat handicaps) all troops fight against equally similar enemy troops, superiority in numbers where the fighting is taking place is everything. Generally, if you want to know who is going to win a battle involving land (and supporting air) forces, count the units on both sides and see who has more.

Computer players build a lot of land units and often leave them milling around on the land-

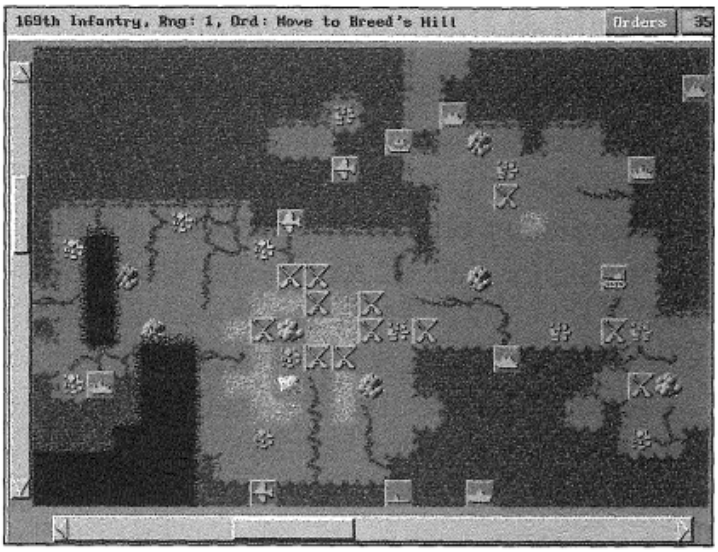


Figure 8.6 A massive island invasion

mass where they were built (see Chapter 15). Consequently, they will usually have many land units able to come to the defense of one of their cities. Therefore, it is imperative that you achieve the necessary mass to triumph over this expected large number of defenders. (Wags refer to this as reaching "critical mass.")

In Figure 8.6, the forces attacking from the east have ground down the western defenders through the principle of mass. Provided they reinforce their strength enough to at least replace their losses (i.e., maintain their mass), only the eastern invader's own bad luck could stop them.

If your luck averages out, concentrating superior forces at decisive times and places is the greatest single key to success in *Empire Deluxe*. Do not engage in a campaign to take a landmass piecemeal when the enemy defends it. Concentrate your forces, and strike with as great a strength as possible.

Velocity

Move an assembled mass of units as rapidly as possible to maximize their gains while the enemy is still preparing to react. In physics terms, the *force* of military strength equals its *mass* times its *velocity* (or speed). In other words, a large body of troops is far more menacing when it is moving. Do not sit on your advantage of mass, but multiply its strength instead by keeping it moving—press your advantage!

Utilizing air units in a rapid forward deployment is a good example of using velocity. Because of their ability to quickly stage to a battlefield and attack several times per turn, they can immediately bring an edge to spearpoint your mass.

Principle 6: Economy of Force

When you are employing the minimum essential means at points other than that of decision, you have achieved economy of force. This means always having your units doing the most important task that they can be working on. Since you build units to accomplish your strategic goals, not using them properly is a waste of precious resources and a violation of this principle. A unit that is doing nothing is worse than a dead unit, because a dead unit does not count toward lowering your economy's overall efficiency, whereas an idle unit does (see Chapter 10). The *efficient* use of strength makes your entire military stronger.

In practical terms, this may mean disbanding units (especially the cheaper infantry units) in your rear areas once you have moved the lines so far forward that they are no longer required for defense. If they cannot be easily transported to the front, disband them, particularly if they become a drag on your overall economy due to an overproduction of units (see Chapter 10).

Economy of force can also be broadly defined as having the right unit available to do the right job (i.e., rocks break scissors, etc.). For example, an undamaged cruiser is almost certain to eliminate an enemy army on a coastline, whereas a friendly airplane or infantry would

only have an even chance against it. Absorbing damage with your big ships from enemy land and air attacks might also be considered economy of force (particularly when those ships are repaired and come out again to fight another day). Fighters are more economically employed against single-hit units (such as armies and airplanes) while bombers are more economically advantageous to use against units that require two or more hits to destroy (such as tanks and ships).

Principle 7: Maneuvering

Maneuvering must be used to alter the relative combat power of military forces. This means that the goal for moving your units is to gain a local advantage over your opponent somewhere on the map. There are three classic maneuvers of conventional warfare that will prove particularly useful to *Empire Deluxe* players. They are:

1. The feigned withdrawal
2. Attacking from a defensive position
3. The indirect approach

The Feigned Withdrawal

A feigned withdrawal tries to achieve enemy disorganization by getting them to move out of their prepared positions to pursue the withdrawing force. This means getting the opponent's troops to come out of their defensive terrain and his ships to move into or out of their ports (whichever works to your advantage—into their ports when you have planes nearby and out of them when you have ships, particularly submarines, ready to deal with the enemy fleet). Since a moving enemy can't remain as organized as a static one, by ceasing your feigned withdrawal and counterattacking, victory can be more easily gained. If you can't break a prepared enemy outright, trick him into pursuing you.

This maneuver works best when the commander executing it is disciplined and skilled in the art of war and his opponent is inexperienced. In other words, it is a trick that seldom works repeatedly on the same adversary.

Attacking from a Prepared Defensive Position

Attacking from a prepared defense presents the best of all opportunities and is the goal of any proactive defense. This means having an enemy bash his head against your prepared defenses so that he's too weak to resist your carefully prepared counterattack. When you can sally forth from a position of relative safety (out of defensive terrain for land units or out of ports for naval units hiding from enemy ships) at a critical moment in the battle and disorganize an enemy's attack against you—then you will achieve a decisive victory. However, when you attack and win, your forces will be leaving their defensive terrain, so make sure that the enemy is exhausted before launching your counterattack.

The Indirect Approach

There are many different theories about what makes maneuvers successful. For instance, in his magnum opus, *Strategy*, B. H. Liddell Hart stressed that "a successful army operates along the lines of least expectation." This theory of using the indirect approach means to be obtuse and subtle in maneuvers, rather than doing what the enemy expects and, therefore, will be best prepared to resist. Computer players, by the way, generally expect your attacks to come at the landmass they have nearest you. If that is your objective, try to find an indirect route to getting there rather than just sailing in head on.

The path of least expectation is the path of least resistance. In other words, to guarantee the

success of an attack, attack where there is no defense. It is natural for a player to have troops on the front lines, so use an indirect-approach maneuver and strike them on their flanks or, better yet, in their rear areas. Wherever the mass of the enemy's strength is, attack elsewhere. Not only will your attack succeed, but the enemy will waste his energy putting out the fires you have started rather than concentrating his energy on attacking you. You are also presenting him with a good opportunity to overreact or even panic, thus further compounding his problems.

Principle 8: Surprise

Surprise may decisively shift the balance of combat power in favor of the commander who achieves it. It means accomplishing the unexpected to gain an advantage. The essence of surprise is to exploit a weakness that the enemy didn't know existed. A secondary goal of surprise is giving the enemy a distraction to concentrate on and waste his energy dealing with it. Using an indirect-approach maneuver is the best way to achieve surprise.

Surprise, however, is not only difficult to achieve, it is difficult to maintain as well. It is hard to devise either a plan so cunning or a maneuver so bold that the enemy is caught completely unprepared. It is harder still to do so to that same enemy more than once. However, surprise remains an element to strive for in your plans. Nothing builds your legendary status as fast as repeated, successful surprise maneuvers.

Surprise usually requires wide maneuvers, which means it will take time to develop a situation that might catch the enemy off guard. One distraction useful for obtaining surprise is a close-to-the-enemy *curtain of maneuver*—creating an action along the front lines that will concern the enemy and distract his attention while your surprise element silently masses up and maneuvers stealthily around it.

Magicians often focus an audience's attention on one hand while the other hand prepares the trick. So, too, should generals seeking to surprise their enemies be like magicians. Good generals should use a bit of sleight-of-hand and make their forces seem to appear out of nowhere, where the enemy least expects them, to achieve surprise. (Perhaps it is not coincidental that programmer/designer Mark Baldwin used to be a magician.)

Can you surprise computer opponents? Yes, and in much the same manner as you can human opponents. The only difference is that the computer players will never become flustered, overreact, or compound their difficulties after they realize they have been surprised. Generally, if you can find a way to maneuver a strong force into the enemy's (thought-to-be) safe rear areas, you will draw a reaction. This is true, even against computer opponents.

Principle 9: Security

Security is essential to the application of the other principles of war and to prevent being surprised. This means that if your landmasses and sea lanes are not secure, you will be distracted by enemy attacks against them. When you are distracted, you will lose focus and it will be far more difficult to achieve your objectives.

Achieving security requires leaving behind detachments so that landmasses, cities, air bases, and important sea routes are not attacked by surprise. These detachments are your sentries and units on patrol routes. If you make skillful alliances (see Chapter 13), they, too, can add to your security.

Security is usually linked to the principle of economy of force. This is because leaving behind abundant defensive forces violates that principle. Measure carefully, therefore, how

much of your main force's mass must be left behind on patrols and garrison duty; measure this by the skill of your opponents.

Do not reduce the mass of your main force(s) more than you must—that is the principle of economy of force. Conversely, do not leave behind defensive reaction forces that are insufficient to deal with enemy surprises—that is the principle of security. Knowing where the balance lies between these principles is the mark of an experienced commander.

Fortunately, the computer player's maneuvers are not subtle; they will always try to engage you head on. Therefore, when playing solitaire, do not concern yourself very much with the security of your interior areas. Wily human opponents, however, can and will land their blows unpredictably. Against human opponents, you must increase your security and be better prepared for their surprises.

The Patrolling Principle

While the method for establishing patrols was presented in the previous chapter, it is important to remember why patrols are established. Patrols exist to provide you with early warning of enemy activities. This gives greater security, and the information that efficient patrolling can provide will help keep you from being surprised by enemy maneuvers.

Securing the Terrain

Know the terrain and find the avenues of maneuver on it. Recognize the easiest routes of travel (i.e., the fastest and least dangerous) and the key interaction points (i.e., the strategic ports and land crossings that are discussed in the next chapter), and patrol them. Recognize the easiest approaches the enemy can take to attack your own empire, and guard them.

Air-Base Observation Posts

One valuable unit for security is the air base. *Question:* When is an air base not an air base? *Answer:* When you make it an observation post!

Air bases make excellent static observation posts because of their two-square sighting range and the fact that they, like other units, once sighted by the enemy have their locations disappear from their sighting reports in three turns. Thus, your air bases discovered by the enemy might be forgotten (even by computer players, according to designer Mark Baldwin, if they are not considered by the artificial opponent to be an immediately important target). Naturally, your air bases also can be used to base air units, and these planes can quickly engage any trouble that observation posts have discovered, as shown in Figure 8.7. Nothing is going to sneak unobserved or unchallenged though this well-watched strait shown in that figure. Note that the submarine belongs to the player owning the air bases. Without that submarine there, an enemy submarine could sail right past those air bases completely unobserved.

The disadvantages of using air bases as observation posts are their immobility, the fact that they can be destroyed as easily as an

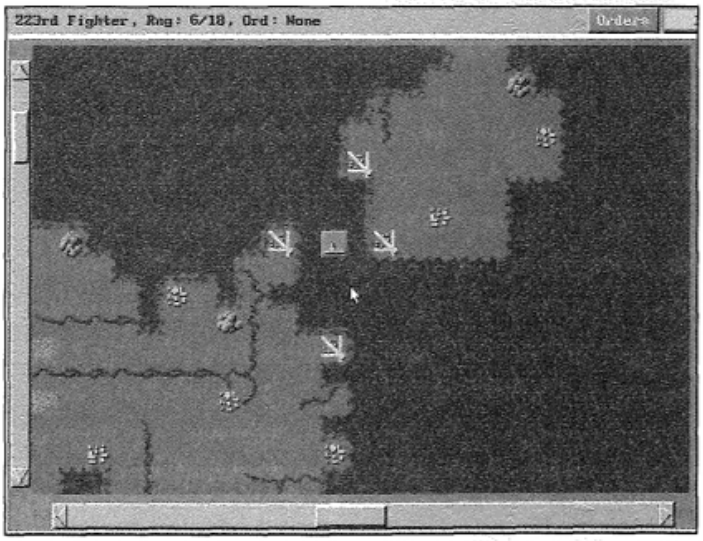


Figure 8.7 A well-guarded strait

infantry unit, and the fact that they can't see enemy submarines. However, placing these observation posts on key islands, straits, and capes will greatly enhance your ability to see enemies maneuvering around these strategic locations. There will even be times when you can use their unequal sighting range to your advantage (as described in Chapter 7) and launch a local surprise attack.

In Figure 8.8, light blue has set up a stealthy area of observation (called a line of observation) from north to south using a combination of airbase observation posts and submarine patrols. The invasion by darker, purple units to the north can be observed more closely in Figure 7.9, in the previous chapter, where the air base's sighting-range advantage is also explained.

Using air bases as observation posts (particularly when they have bombers on them to provide some muscle) in conjunction with patrolling submarines, will give you a stealthy line of observation and a surprise counterattack force that can quickly undo an enemy's maneuver. This represents a strong form of passive/reactive security.

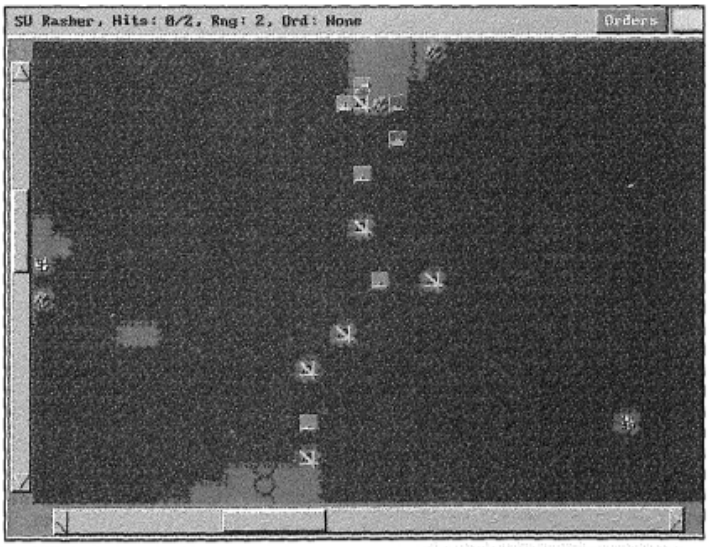


Figure 8.8 A picket line of air bases and submarines

Measuring Reaction Forces

The purpose of having defensive reaction (or react) forces is to keep enough strength nearby to quickly beat back a small invasion force (one to two transports plus one to two supporting ships). While react forces could always be better used in an offensive somewhere against the enemy, your own security must be maintained. When calculating how strong a force has been left for domestic defense, be sure to factor in the strength of your patrolling units.

Remember to keep your react forces centrally located in vulnerable areas. Swift units, such as armor, destroyers, and airplanes make excellent react forces due to their mobility. Bombers, in particular, make excellent react units. Their ability to strike targets on land and sea, their speed, and their offensive hitting power make them well suited for rapid redeployment and counterattack.

If and when you are invaded, deal with it quickly. Hasten your react forces there and resecure the area. Playing experience will teach you not to ignore and not to overreact to enemy invasions, but to meet them with only the proper forces necessary to extinguish them. Spend as little energy as possible on defense. Focus it, instead, on taking offensive action.

The Best Defense Is a Good Offense

This American football axiom also has an application to a discussion of the principles of war. Taking the initiative with offensive action means that your opponent will need to concentrate on what your forces are doing, and will have less energy and resources to devote to disturbing your rear areas. Therefore, when you are on the offensive against an enemy, you should need fewer forces for security against his attacks. If, through your offensive maneuvers, you control

where the enemy places his forces, he cannot threaten you.

However, the many enemies you might face can come at you from several directions in *Empire Deluxe*, particularly when the map wraps and there are no safe corners for you to securely hold. It is always where your main forces aren't that you must be on guard against the enemy you are not engaged with. Their blows can strike cruelly and suddenly, like the proverbial knife in the back.

BEYOND THE PRINCIPLES OF WAR

Above all else, *Empire Deluxe* is a game of strategy. Those who have mastered the principles of war will always be favored to win. Beyond the general principles and specific tips provided above, we have included these additional references to improve your strategic plans when playing *Empire Deluxe*.

Taking Time to Think

Empire Deluxe is not a time limited game. You need not be hasty either in planning your moves or in executing them. Except for some special rules provided for in certain scenarios, games of *Empire Deluxe* are always of an unlimited length. Therefore, *take your time and carefully plan your strategy*.

In particular, use the "waiting bookmark" technique you learned in Chapter 6. Let that unit serve as your reminder on every turn to double-check your moves and production, and to save the game before the computer player's turn begins. Now let us re-examine the important good habits learned in Chapter 4 and elaborate on them:

- Call up the Production Map and reflect on your overall building strategy. You may want to adapt it or your battle plans so that these two crucial elements work together in harmony. It is best to have the right units produced to meet your situation's specific needs.

To find out if you are producing the right amount of each unit type, look at your Status Report screen. As a rule of thumb, the higher a unit type is on that list (i.e., land units are at the top of the list, followed by airplanes, then ships), the more of them you should be producing to keep your forces balanced. However, this rule of thumb bears many exceptions and must remain flexible in light of your immediate needs and long-range strategic plans.

- Reconsider the value of your air bases, patrols, convoys, and garrisons. Any units performing these duties that are no longer useful should be reassigned to a more productive purpose or be disbanded. Remembering the principles of mass and economy of force, be sure to employ every unit to the fullest and to give it an optimum place on the map. Are you making the most efficient use of your units?
- Weigh again your diplomatic situation, both with other human players (see Chapter 13) and computer players (see Chapter 15). Make plans for improving your situation and worsening the enemy's.
- Reassess your strength versus your enemy's strength, and see if you should shift from defense to offense, or vice versa. When you are stronger, consider going on the offense. When you are weaker, consider going on the defense.

Determine an enemy's strength or weakness by the number of their units and cities that you have sighted, the known production efficiency of

those cities, the terrain they will be defending, and the skill and handicaps that that opponent possesses. Add to their strength what your intuition tells you they might also have that you have not yet discovered or sighted. Intuition, unfortunately, is a product of experience, so new players may not fare well with this part of the equation. The sum of these factors will allow you to assess your opponents in terms of their relative strength.

Deciding Which Enemy to Hit First

As the Germans could tell you from their experiences during world wars I and II, avoid fighting a two-front war. Concentrate your strength against a single enemy at a time and crush that enemy completely before launching an offensive against the next one. Avoid being forced to divide the mass of your strength between multiple active fronts. Although this is not always possible (you may be attacked from several directions at once), it is always to strive for.

Since you will often have more than one opponent to choose from once you are prepared to let the hammer fall, you must ask, "Whom do I attack first? In what direction should I apply my forces' energy?"

Generally, you should attack the weakest player first and try to remove him completely from the game. Your weakest opponent can be defeated more quickly and easily than the stronger ones, thus reducing both your losses and the time that you will be exposed to the threat of a multifront war. Furthermore, you will have all that enemy's newly conquered cities producing for you, replacing your losses, and increasing your total strength. This production will be greatly needed when the time comes to attack your stronger foes.

(Note that we defined how you assess strength and weakness in the previous section of this chapter.)

The Role of Luck in *Empire Deluxe*

As we mentioned at the end of Chapter 6's section on the "waiting bookmark" technique, luck in *Empire Deluxe* is fixed in the random-number seed. Consequently, with the myriad of times per turn that dice are rolled by the computer to resolve matters, it should average out.

It is important to know that the computer players do not cheat in *Empire Deluxe*. Although the artificial intelligence routines used by the computer will be explored in depth in Chapter 15, let us say here that, in the same manner as human players, the computer players don't know what they haven't specifically discovered or sighted. They are not playing with any special foreknowledge.

A SAGE IN TIME . . .

> The first quality in a general-in-chief is a great knowledge of the art of war. This is not intuitive, but the result of experience. A man is not born a commander. He must become one.
>
> —Montecuccoli

Learning these principles of war is an important first step to becoming a great commander. The second step is to live them and make them habitual—something you do instantly and without conscious thought. Habits, of course, are developed by repeatedly doing something. To help you remember and repeatedly apply the principles of war, we have written them along the top of the player-aid card attached to the back cover of this book. These principles of war are not merely something to read or even learn—they are something to truly *live*.

What follows is a special feature that we've shared with others in previous books. It is right that an "instant course" in good generalship be summarized by great thinkers. Quickly, then, to review:

1. Why should I learn the principles of war?

   Untutored courage is useless in the face of educated bullets.

   —George S. Patton, Jr., in *Cavalry Journal*, April, 1922

2. Can't I win without knowing these principles?

   Sometimes we see a hazardous campaign succeed, the plan of which is directly at variance with the principles of the art of war. But [its] success depends generally on the caprice of fortune or upon faults committed by the enemy—two things upon which a general must never count.

   —Napoleon

3. Why should I listen to all these quotes?

   Wise warriors are mightier than strong ones, and those who have knowledge than those who have strength; for by wise guidance you can wage your war, and in abundance of counselors there is victory.

   —Proverbs 24: v–vi

4. The "art of war" seems so difficult, though.

   The art of war is simple enough. Find out where your enemy is. Get at him as soon as you can. Strike at him as hard as you can, and keep moving on.

   —Ulysses S. Grant

5. Are there other simple examples of the "art of war"?

   The enemy advances, we retreat. The enemy encamps, we harass. The enemy tires, we attack. The enemy retreats, we pursue.

   —Mao Tse-Tung

6. Don't these principles actually restrict my creativity rather than assist it?

   Of all the theories on the art of war, the only reasonable one is that which, founded upon the study of military history, admits a certain number of regulating principles but leaves to natural genius the greatest part of the general conduct of a war without trammelling it with exclusive rules.

   —Antoine Henri de Jomini, *Précis of the Art of War*, 1837

7. But the other players keep frustrating my plans!

   You will usually find that the enemy has three courses open to him, and of these he will adopt the fourth. No plan survives contact with the enemy.

   —Hulmuth von Moltke (the Elder)

8. So I shouldn't even bother to make plans?

   One does not plan and then try to make the circumstances fit those plans. One tries to make plans fit the circumstances. I think the difference between success and failure in high command depends on the ability, or the lack of it, to do just that.

   —General George S. Patton, Jr.

   It's easier to change a plan than to make one.

   —Roger-Tzu

9. All right, I surrender. Where can I learn more?

   Peruse again and again the campaigns of Alexander, Hannibal, Caesar, Gustavus Adolphus, Turenne, Eugen, and Frederick. Model yourself upon them.

This is the only means of becoming a great captain and of acquiring the secret of the art of war. Your own genius will be enlightened and improved by this study and you will learn to reject all maxims foreign to the principles of these great commanders.

—Napoleon, *Maxims*

10. You mean read *history books*?

Historical examples provide the best kind of proof in the empirical sciences. This is particularly true of the art of war.

—Karl von Clausewitz

11. So I really should study this stuff?

With 2,000 years of examples behind us, we have no excuse when fighting for not fighting well.

—T. E. Lawrence (of Arabia)

GRADUATION FROM STRATEGY SCHOOL

Let your successes and your failures teach you the lessons required to earn a degree from this, the *Strategist's School of Hard Knocks*—without requiring the 15,000 *real* casualties Marshal Ferdinand Foch estimated it took to train one major-general during World War I. No doubt by now your mind is swimming with great thoughts and sound military principles.

The next chapter, which concerns itself with the particulars of engaging units in tactical, one-on-one battles and conducting local operations, gives your eye a different look at warfare. Where strategy examines the broader aspects of warfare through a telescope, tactics examines its details through a microscope. Let's bump some units together and see who wins in the next chapter, shall we?

Combat Close Ups

The previous chapter focused on the strategies you should use for winning the wars in *Empire Deluxe*, strategy being defined as the larger and broader elements of military planning. This chapter reverses the focus from the larger aspects of strategy to the smaller details of tactics. Instead of learning where to mobilize and sweep the main mass of your troops, in this chapter you will learn how to deploy them on the map and use them effectively as they move and combat the enemy.

It is important to remember that the nine principles of war learned in Chapter 8 provide useful lessons for both strategic and tactical operations. Even as this chapter teaches you the particulars for engaging units in tactical, one-on-one battles and conducting local operations, the principles of war never change. To them we will add tips for improving your strength on a tactical scale. Specifically, you will learn how to use the different unit types to support each other properly to gain the maximum combat benefit from each.

HOW THE COMBAT SYSTEM WORKS

The best way to sum up the combat mechanics of *Empire Deluxe* (as explained in page 132 of the game manual) is to call it the "bump-and-pray" system. As one unit attempts to enter a square occupied by an enemy unit or city, a one-on-one battle results between those two units and is quickly resolved (the speed of the battle resolution being a player-defined option inside the Display menu under User Prefs).

From that battle, one side's unit will survive and the other's will be eliminated. In other words, the losing unit of a one-on-one battle does not limp away wounded; it dies—period. The surviving unit may have taken some damage (and will remain damaged until it is repaired), but the losers are always removed from the game.

The Four Combat Ratings

Each unit has four ratings. For each rating, the higher the number, the better it is for that unit. They are defined as follows:

- **Attack rating:** This is the base chance a unit has of hitting the enemy when it is attacking (i.e., when it is moving into the enemy's square).
- **Defense rating:** This is the base chance a unit has of hitting the enemy when it is defending (i.e., when an enemy unit is moving into its square).
- **Shot Damage:** This is how many hits a unit inflicts on an enemy unit when it hits it during a combat *miniround* (which is explained further on).
- **Damage:** This is how many hits (i.e., how many cumulative points of Shot Damage) a unit can withstand before being destroyed.

These ratings for each unit type are presented in Table 9.1.

Some instant and obvious conclusions can be interpreted from Table 9.1. They are as follows:

- Land units should always try to stay inside defensive terrain whenever possible, although this will never help them if they are attacked by enemy infantry units.
- Land units are particularly vulnerable to shore-bombardment attacks and will do much better when they attack enemy ships (or flee from them to safety) rather than waiting to be bombarded by them.
- In any battle between a fighter and a bomber, try to be the owner of the fighter.
- Attacking with carriers and transports is a bad idea (even though you will often see the computer players doing it).
- Attacking aircraft with ships is a bad idea.

Combat's Invisible Minirounds

A battle between two units takes place in a series of invisible minirounds. During each miniround, a value for the moving (attacking) unit's strength and the stationary (defending) unit's strength is calculated. The attacker's strength is then compared with the total of both the attacker's and defender's strength to find the attacker's odds of winning that miniround. This ratio is turned into a percentage number and then rounded off (with .5 rounding up to the next whole number) for the attacker's success. The computer generates a random number from 1 to 100 and, if it falls within the attacker's percentage, the attacker hits the defender; if not, the defender hits the attacker during that miniround.

Battle Miniround Outcome Formula

Step 1: Calculate Attacking (i.e., "Moving") Unit's Strength

Attack Rating x Target Modifier x Crippled x Efficiency = Attacker's Strength

Attack Rating = 1 for transports and carriers
= 2 for all other unit types

Target Modifier = x .5 for fighters bombing a city
= x .5 for bombers attacking fighters
= x .5 for ships (except carriers) attacking air units

Crippled = x .5 if the attacking unit currently has 50% or more damage

Efficiency = x .? (see Table 9.3)

Step 2: Calculate Defending Unit's Strength

Defense Rating x Defense Modifier x Efficiency = Defender's Strength

TABLE 9.1: ADVANCED GAME UNIT COMBAT RATINGS TABLE

UNIT TYPE	ATTACK*	DEFENSE	SHOT DAMAGE	DAMAGE
Infantry	2	2 (1) vs. shore bombardment. (4) when defending in a forest or mountain square against a noninfantry-unit attack, or when defending in a river square and attacked by an armor unit.	1	1
Armor	2	2 (1) vs. shore bombardment. (4) when defending in forest square against a noninfantry unit attack, or when defending in a river square and attacked by an armor unit.	1	2
Fighter	2 [1] when bombing cities.	2	1	1
Bomber	2 (1) [2] when bombing cities.	2 (1) vs. fighters.	2	1
Transport	1	1	1	3
Destroyer	2 (1) when attacking air units.	2	1	3
Submarine	2 (1) when attacking air units.	1	3	2
Cruiser	2 (1) when attacking air units. + may conduct shore bombardment.	2	2	8
Battleship	2 (1) when attacking air units. + may conduct shore bombardment.	2	3	12
Carrier	1	2	1	8
Air Base	N/A	2 (1) vs. shore bombardment.**	1	1
City	N/A	2 [2] when being bombed by airplanes.	1	1

* Attack rating is halved when units are "crippled" by sustaining 50% or more damage.

** Although not stated in the manual, this is correct.

Defense Rating = 1 for transports and submarines

= 2 for all other unit types

Defense Modifier* = x .5 for infantry, armor, and air bases when shore bombarded

= x 2 for infantry and armor when defending in a forest square against a noninfantry-unit attack

= x 2 for infantry when defending in a mountain square against a noninfantry-unit attack

= x 2 for infantry and armor when defending in a river square against an enemy-armor-unit attack

x .5 for a bomber being attacked by a fighter

Efficiency = x .? (see Table 9.3)

*All Defense Modifiers that apply are used. For example, an infantry unit in the mountains (x 2) being shore bombarded (x .5) would receive no Defense Modifier since they combine to cancel each other out (x 1).

STEP 3: DETERMINE THE ODDS RATIO FOR THE ATTACKER WINNING

Attacker's Strength / (Defender's Strength + Attacker's Strength) = Odds Ratio for the Attacker Winning

The Odds Ratio for the Attacker Winning is then calculated into a whole percentage number (rounding off any fractions to the nearest whole number).

STEP 4: THE COMPUTER GENERATES A RANDOM NUMBER FROM 1 TO 100.

If the number falls within a spread less than or equal to the Attacker's Winning percentage, the attacker wins that niniround; if not, the defender wins it. The winning unit subtracts its shot-damage value from the losing unit's current damage rating. If that causes the losing unit's damage rating to drop to zero or less, it is destroyed and the battle is ended. If not, another miniround ensues.

Simple combat examples are included in the game manual's Appendix B. None of these, however, considers either the combat efficiency modifier (see Table 9.3) or the rounding off of the attacker's final percentage number. Since you now have the exact formula, you may work out the math of any battle for yourself.

Analyzing One-on-One Battles

For those who may not be handy with a calculator, the exact percentage breakdowns for the outcome of every possible combat situation are presented in Appendix B. These tables show the end results only, after all of the minirounds have been fought and the battle is concluded with one side or the other being eliminated. Note that no combat modifiers have been applied to either side in determining their results.

Combat "Handicap" Ratings

The preceding combat formula included a variable for a player's combat handicap. These can be selected for each player individually from the combat-handicap column of the Player Setup screen. If selected, these handicaps reduce the combat strength of that player's units in all battles throughout the game. The exact percentages and combat formula multipliers are given in Table 9.2.

To stop playing with a handicap, save the game and reload it. Then simply reset the handi-

TABLE 9.2: COMBAT-HANDICAP PERCENTAGES

HANDICAP	COMBAT-EFFICIENCY RATING PERCENTAGE	COMBAT-FORMULA EFFICIENCY MULTIPLIER
None	100.0%	1.000
Slight	90.9%	0.909
Moderate	80.0%	0.800
Average	66.7%	0.667
High	57.1%	0.571
Severe	44.4%	0.444
Extreme	33.3%	0.333

cap on the Player Setup screen before re-entering the game. Following is an example of how the combat modifiers work in practice:

Assume an enemy bomber is attacking our armor unit in a forest square. Since they both can kill each other with a single shot, the math is fairly simple as there will be only one miniround—the winner will take all. First, the bomber has its standard attack strength of 2, while our armor (thanks to defending in the forest) has its 2 defense strength doubled to 4. Doing some quick math, the attacking bomber has a 2/(4 + 2), or 33.3 percent, chance of winning. This rounds off to 33 percent, leaving our tank with a healthy 67 percent chance remaining of winning. The odds look good for us.

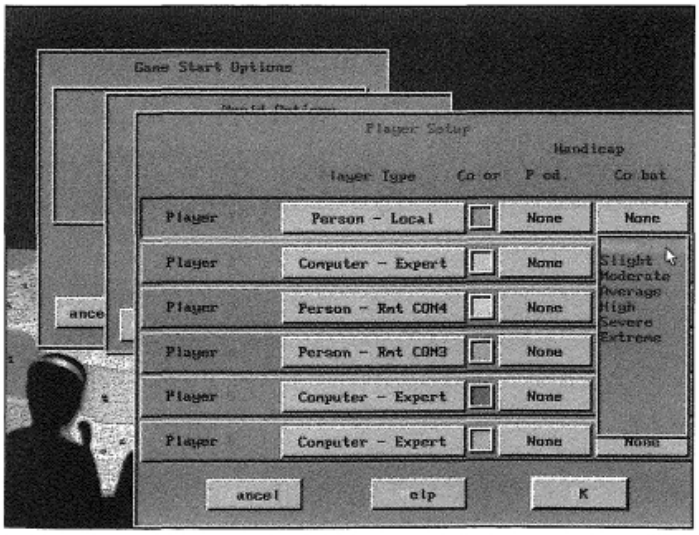


Figure 9.1 Choosing combat handicaps from the Player Setup screen

Now, let's consider what would happen to our odds if we had a combat handicap, shall we? With a slight handicap (which reduces our combat efficiency to 90.9 percent of normal) our tank would have a 4 x .909, or 3.636, defense strength. This would give the attacking bomber a 2/(3.636 + 2) which gives it a 35.5 percent chance of winning, which rounds up to a straight 36 percent chance, leaving our armor with a 64 percent chance to win.

By continuing to increase the combat handicap of the player with the armor unit in this example, we get Table 9.3.

For a lark, you can take out a calculator and work out the numbers for a few more theoretical battles. Plug in a some various combat handicap modifiers and notice the difference they make on the attacker's final winning percentage number. You will quickly learn that accepting a combat handicap (particularly the higher ones) should

TABLE 9.3: COMBAT-HANDICAP EXAMPLE RESULTS:

PLAYER HANDICAP RATING	HANDICAP PERCENTAGE	BOMBER % TO WIN	ARMOR % TO WIN
None	100.0%	33%	67%
Slight	90.9%	36%	64%
Moderate	80.0%	39%	61%
Average	66.7%	43%	57%
High	57.1%	47%	53%
Severe	44.4%	53%	47%
Extreme	33.3%	60%	40%

not be taken lightly. Remember, it effects every combat situation that player is involved in throughout the game!

The Post-Combat Situation

After the battle, the victorious unit will occupy the square under contention. Two exceptions to this are battles between ships and land units, and when an armor unit attacks an infantry unit on a mountain square. That is because these units are prohibited from entering the terrain the defender was occupying. Note also that ships are prohibited from attacking enemy units in cities (however, the units *inside* cities can attack from them).

If you sank a transport or carrier that was carrying other units, destroyed an air base that housed enemy planes, or captured an enemy city, be sure to check the Information bar at the top of the screen. It will tell you how many additional units were destroyed along with the transport, carrier, air base, or city. If that information is not presently on the Information bar after the battle, immediately scroll backwards through its messages using the minus key (-) until you see it.

Unfortunately, the Information-bar message won't tell you what type of additional enemy units were destroyed. However, that information is recorded on the changing numbers of your Status Report screen under the "We've Killed" column. By noting the numbers in this column before and after a battle against enemy cities, transports, aircraft carriers, and air bases, you can learn exactly what additional losses you inflicted on the enemy. For example, if you capture an enemy city and the message bar informs you that ten additional units were destroyed, those ten additional losses will be registered under "We've Killed" on your Status Report.

For those who fail to check their Status Report before and after every battle where the potential for multiple enemy losses might occur, these additional losses can often be deduced. For example, carriers can carry only fighters. Transports can carry only land units and, if there were more than three units on board, at least two of them had to be infantry units due to limitations on their carrying capacity (see below). Air bases, naturally, can hold only air units. Cities, however, can hold everything—and in unlimited

quantities. You will just have to guess what the additional enemy losses were when you capture a city or keep a careful before and after count on your Status Report display.

Damage Effects

When your ships and armor units suffer damage in battle, you should repair them. The damage information for friendly units can be found on the Information bar while the unit is blinking. Alternately, a unit's damage information can be obtained by selecting the unit with a single click of the right mouse button over it or a double click of the left mouse button. (Note, however, that you cannot get damage reports on enemy ships and armor units in this manner.)

Crippled units have their attack ratings halved, so their chances of surviving any offensive combat are greatly reduced. Furthermore, their movement drops to one square per turn (making it tough for them to escape for repairs). The cargo capacities of transports and carriers are also reduced proportionally to their damage. Specifically, each hit on a transport reduces its carrying capacity by two, while each hit on an aircraft carrier reduces its maximum fighter carrying capacity by one. If those units are carrying cargo over their newly reduced carrying capacity after sustaining combat damage, that cargo is immediately destroyed!

> When an enemy port is building a transport, if you are prepared to sink it quickly after it is launched, don't bomb that city's production with your airplanes. Instead, let it complete the transport and sail out with it full of cargo. Then you can sink it and all units on board.

The Effects of Damage on Transports

The hell of taking losses from a transport filled to its current capacity is that, if it suffers damage, the transported units lost are immediately chosen randomly, one at a time, until the transport's new (reduced) capacity is no longer exceeded. This could result in losses that work to the transport's disadvantage.

> In the old *Empire* game, players had a turn to unload surplus cargo from their damaged transports. Not so in *Empire Deluxe*.

For example, an undamaged transport is filled to capacity with two infantry units and two armor units on board. It takes one hit, and its carrying capacity is reduced by two. It randomly selects a unit to destroy. If it is an armor unit, fine. The cargo has been reduced to the new capacity, and it stops randomly throwing units overboard.

However, if it picks one of the two infantry units first (after all, there is a 2/4 chance of that), the transport's newly reduced capacity would still be exceeded. This means that it will pick another unit to throw overboard to bring it down within the limits. Naturally, picking the other infantry unit would neatly keep the transport running at full capacity, but there is now a 2/3 chance that it will pick one of the armor units. If it does (which is likely), this would reduce the ship's cargo to *below* capacity. This is exactly the way these random losses might turn out when transports take damage!

Repairing Damage

Keeping ships and armor units up to full strength is important

> Unlike the old *Empire*, a unit cannot skip a partial turn's worth of movement and still be repaired. Repair takes up a unit's *entire* move for that turn.

because of the ill effects previously explained. To repair a unit, send it to a friendly city (naturally, ships will require a port city) and have it sit there. For every full game turn skipped by a damaged unit in a city (either through the Menu bar, under Orders, Skip/Cont.; or by simply pressing the Spacebar), one point of damage is repaired.

Repair has two negative elements. The first, obviously, is that units are nearly worthless while being repaired. They are not fighting and will die automatically if their repair city is captured by enemy land units. Their only hope would be to forego repairs and either flee from or fight oncoming enemy units.

The second disadvantage concerns repairing ships near enemy aircraft. It may take several turns to repair a severely damaged cruiser, battleship, or aircraft carrier. During this time, an enemy air unit may come along and bomb their repair city. As you will learn later in this chapter, ships are extremely vulnerable to air attacks while in port (remember Pearl Harbor).

EVERYTHING ABOUT LAND UNITS IN COMBAT

Ultimately, every war and every game of *Empire Deluxe* is won on the ground. Ownership of cities is the yardstick of success in *Empire Deluxe*, and only land units can capture cities. In the grand scheme of things, all of the other units exist only to support the ground troops. It has always been that way, and always will be.

Important Facts About Land Units

- Land units should always try to stay inside defensive terrain whenever possible (see Table 9.1).
- Land units do not receive any defensive terrain advantage when attacked by enemy infantry units.
- Land units are particularly vulnerable to shore bombardment attacks and will do much better attacking ships they can't run away from than waiting to be bombarded by them (see Table 9.1).
- Land units are entirely dependent on transports to ferry them across the water.
- Land units can be converted into air bases, and there will be times when it is advantageous to do so (see the following).

Infantry Units / Armies

While known in the Basic and Standard games as "armies," in the Advanced Game these are called "infantry" units, and we use both names interchangeably in this book. Armies are the basic land unit. Moving one square per turn through any terrain type, this can occasionally allow them to move over rugged landmasses (particularly those with a lot of mountains on them) faster than armor units. Infantry also can stand toe-to-toe in combat with another army, city, air base, fighter, or bomber (as shown on Table 9.1). They are also the quickest (and, therefore, the "cheapest") unit to produce in the game (see Chapter 10).

Armor Units

Armor units, which we also call "tanks," only exist in the

Advanced Game. They feature a mixed bag of advantages and disadvantages. On the up side, they can move two clear- and city-terrain spaces per turn and require two hits before being destroyed in combat. On the down side, they take twice as long to produce as infantry units and take up twice as much space on board a transport. Furthermore, they die just as easily as infantry units when attacked by bombers or shore bombardment, they cannot enter (although they can attack) mountain squares, and it takes their entire move for them to enter forest, river, and rough terrain.

Therefore, the secret of success for armor is in making the most use of their two advantages. (This play on words might help you remember them: two moves plus two hits equals *two* advantages.) Two moves can mean two attacks per turn. It also can mean moving around an enemy unit on the first move and attacking a city or air base behind it on the second. This type of blitz movement greatly reduces the enemy land units' ability to react to you on the battlefield.

Two hits means that it might survive a battle in a crippled condition that would have otherwise destroyed an infantry unit. When this happens, count it as a blessing, limp it back to a city, and fix it. Remember, a crippled armor unit has its attack strength halved—so, until it is repaired, it attacks *worse* than an infantry unit does (an infantry unit will always have an attack strength of two, compared to a crippled armor's one). Therefore, avoid pressing attacks with crippled tanks. Having two hits also means that if a tank conquers a city without sustaining any damage in the process, it will give you an infantry unit there as *change* on the next turn (i.e., that newly created army cannot move on the turn the city is captured, but it is in the city nonetheless and will be counted among the dead if the city is immediately retaken by another player).

Air Bases

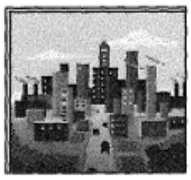
Air bases exist only in the Advanced Game to fulfill two primary roles: that of observation posts and, well, to serve as air bases! Since they can only be built on clear-terrain squares, they have little use as garrisons and they fight no better than the infantry units (and worse than the armor units) that spawn them.

Air bases are created by moving a land unit (preferably infantry, since they are cheaper) to the clear-terrain square desired and giving it the Unload command from the Menu bar ([U]) or calling up the unit's individual Orders menu and selecting Build Airbase. You will be asked to confirm that land unit's conversion to an air base. If confirmed, it disappears and is replaced by an air base that has a sighting range of two and can hold an unlimited number of fighters and bombers. (Note that page 121 of the manual says that an air base can hold only eight airplanes. This is wrong. The number is unlimited, as page 42 indicates.)

As explained in Chapter 7, building air bases next to ocean squares will extend their ability to spot and project air power to its furthest limits. However, such coastal air bases are subject to easy destruction (along with every plane currently stacked on them) from enemy ships conducting shore bombardment against them. Conservative players, therefore, may want to build such observation-post air bases one square inland.

> *Hint:* Keep a reserve land unit next to your important air bases so that, if they are destroyed, they can be quickly replaced before planes needing to land there run out of fuel.

Cities



Because cities have a combat role in both sighting and fighting the enemy, we shall mention them here. When conquered, a city receives an invisible garrison comprised of the infantry unit that captured it. If an undamaged armor unit captures a city, it leaves an invisible garrison of one infantry unit and gets a real, live infantry unit back in that city on the following turn as change. A damaged armor unit that captures a city merely becomes that city's invisible infantry unit garrison.

For players who faithfully monitor their Status Report screen, the unit that captures a city is not added to your "We've Lost" column, but it *is* deducted from your "Are in Combat" column. If an undamaged armor unit captured a city, the "Are in Combat" column will register (correctly) that you have one less armor unit and one more infantry unit.

The last of the seven good habits you were taught at the end of Chapter 4's third tutorial lesson advised you against defending a city with several units. When attacked by land units, none of the pieces in the city will help in its defense. Instead, the city defends with only its invisible infantry garrison unit,, and, if it loses, every unit in that city is instantly destroyed.

Of course, it may prove useful to have units in a city so that they can counterattack an invasion coming toward it on their own turn. However, if the attacker closes in too swiftly, (by attacking a port city with units on board transports that began their move just beyond the city's two-square sighting range), the city may be lost with all its occupants before they ever get a chance to either fire back or evacuate.

Another reason to place units in a city is to help defend it and any larger ships stationed there against enemy air raids. (These are more thoroughly discussed in the next section.) That is because each unit, including the city itself (which is counted as a unit for this purpose) has an even chance of being that square's target during an air raid. Therefore, when seeking a port to repair damaged ships at, strive to find one that is out of the range of enemy air power or, failing that, one that has plenty of expendable units in it to reduce the chances of losing a good one to enemy aerial bombing.

Risky Attacks on Enemy Cities

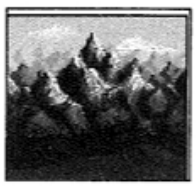
You should strive to capture an enemy's city, even if you know it can't be held for very long, because of the following:

- The enemy may lose additional units inside it.
- It gives you, and denies the enemy, an air base and repair facility on the front lines.
- Even if the enemy retakes it, its production efficiency will have been reduced twice (once when you captured it from him and again when he took it back). Thus, the net effect for the enemy will be to have that city's production halted while you occupied it, and its production efficiency considerably reduced by the time he takes it back. If it changes hands back and forth several times, it will be a long time before that city can effectively contribute to the enemy's war effort again.

This subject is brought up again in Chapter 10, where all of the details about economics and production are also discussed. One exception to not capturing a given player's city is to avoid increasing his animosity toward you (see Chapter 13 on diplomacy).

Terrain Effects on Land Combat

When terrain effects are considered in land combat, only the defender (i.e., the nonmoving play-



er) ever receives any benefits from occupying favorable terrain. The square which the attacking (i.e., moving) unit comes from has no bearing on land combat at all.

Table 9.1 shows that land units have their defense ratings doubled when they are in a forest or (for infantry units only) mountain square when attacked by noninfantry unit types. This benefits them against all types of attack; air, sea, and land (if the attacker is an armored unit). Note that when defending against a shore-bombardment attack, a land unit's defense in forest or mountain squares is halved to one, then doubled back up to two. Thus, the penalty for being shore bombarded is canceled out by the benefits of this defensive terrain.

Land units also have their defense ratings doubled when they are defending river squares and attacked by enemy tank units (only). A land unit's defense rating is not improved when defending a river square against enemy infantry units, aerial attacks, or shore bombardment. Rough and clear terrain never modify a land unit's defense rating.

EVERYTHING ABOUT AIR UNITS IN COMBAT

Because they can operate over land and sea squares with equal ease, and thanks to their amazing speed, airplanes are the units of choice for a variety of missions. Not only do they make the best exploration and observation units in the game (see Chapter 7), they also have an important role to play in battle, even if they tend to die like flies.

When playing the Advanced Game of *Empire Deluxe*, air units can perform five different primary missions: scouting, air superiority, ground attack, air-to-sea combat, and city bombing. This section will explain the combat role of both types of air units in *Empire Deluxe* based on these five primary missions.

Fighters / Airplanes

Under the Standard Game rules, the only air unit is simply called an *airplane*. While similar to a fighter in the Advanced Game, airplanes have an endurance of four turns, move five squares per turn, have a sighting range of one, and cannot bomb enemy cities. In the Advanced Game, fighters have an endurance of three turns, move six squares per turn, have a sighting range of two squares and can bomb enemy cities (with a lesser degree of effectiveness than bombers can).

Fighter-Mission Analysis

- **Scouting (Excellent):** As described in Chapter 7, with their high speed per turn, good range, and superior discovery/sighting range of two squares, fighters make excellent scouts.
- **Air Superiority (Very Good):** Table 9.1 shows that fighters were made for hunting bombers, but the odds are even against other fighters. Note that land units (when they can reach them) are just as effective as fighters for shooting enemy aircraft down!
- **Ground Attack (Fair):** Fighters have the same chances in air-to-ground battles as infantry units do. This gives them an even chance against enemy infantry (and damaged enemy armor) and a less-than-even shot versus undamaged enemy armor.

Considering the time it takes to build a fighter (12 turns) and the two previously mentioned roles that they are better suited for, do not commit them needlessly to ground attacks. Their ground-attack role should be limited to stopping enemy land units that can attack your cities on their next turn or, possibly, clearing the way for your land units to attack an enemy's city. Don't get greedy with this mission. Use fighters for ground support only when there is a city (friendly or enemy) immediately at stake.

- **Air-to-Sea Combat (Poor):** There is a saying from Cervantes that goes "Whether the stone hits the pitcher or the pitcher hits the stone—it's going to be bad for the pitcher." Metaphorically speaking, the pitchers are your airplanes and the stones are enemy ships. As a rule of thumb, avoid frittering away your airplanes trying to sink undamaged enemy ships.

If you must interdict enemy shipping, however, note that your odds in battle double if you can sucker the enemy ships into attacking your loitering airplanes (this is shown in Table 9.1). Therefore, unless you are aggressively after an enemy transport, sniping at submarines (which are easy to pick off), or trying to finish off a crippled enemy ship, it might be better to put your airplanes out to sea as bait and use them to taunt the enemy ships into attacking them. Computer opponents, in particular, are susceptible to attacking airplanes with their ships.

- **City Bombing (Poor):** Since fighters have only a 1/3 chance of successfully bombing a city, and then doing less damage to it than a bomber would, they are not the aircraft of choice for this mission. However, when the enemy city contains large enemy naval units (battleships, carriers, and cruisers), it becomes tempting to use fighters in a Pearl Harbor–style raid on the port. See Bombing Cities with Air Units, later in this chapter, for details.

Bombers

Bombers exist only in the Advanced Game and have an endurance of six turns, moving four squares per turn. Bombers have a sighting range of two squares, a wonderful two-strength Shot Damage rating, and can bomb cities better than fighters (and with greater effect).

Bomber-Mission Analysis

- **Scouting (Excellent):** As Chapter 7 explained, bombers have a decent speed of four squares per turn to go with their excellent flying endurance of six turns. Their superior discovery/sighting range of two squares, combined with their long range, makes bombers excellent scouts.
- **Air Superiority (Poor):** Table 9.1 shows that bombers were made for avoiding aerial combat, not initiating it. Even when hunting other bombers, their odds are not auspicious for gaining air superiority.
- **Ground Attack (Good):** While bombers have the same chances of landing a blow in an air-to-ground battle as their targets do, they do have one special advantage: Their Shot Damage rating of two means that they'll destroy any land unit with a single hit, even undamaged tanks. Since bombers and armor take the same amount of time to construct, and their odds in battle against each other are even, it is a fair gamble to attack undamaged tanks with your bombers. However, do not commit them needlessly to

ground attacks (particularly against infantry units and damaged enemy armor). Like fighters, they should only be employed in a ground attack when there are cities immediately at stake.

- **Air-to-Sea Combat (Fair):** The thing that makes bombers slightly better than fighters when combating enemy ships is their two-strength Shot Damage rating. One hit from a bomber will sink a submarine or cripple a transport or destroyer. The rule of thumb about not frittering away your airplanes trying to sink undamaged enemy ships is still valid, but with their stronger Shot Damage rating, it can be much more rewarding (and tempting) to try it with bombers. For players who like to chip away at enemy ships with their airplanes, use bombers instead of fighters.

In any case, amend that rule of thumb for avoiding air-to-sea attacks. You can freely use your bombers to attack enemy transports and submarines, damaged or not. If you must interdict other enemy shipping, try to play the same game your fighters do—suckering the enemy ships into attacking your loitering bombers. If you must attack enemy shipping, use bombers in preference to fighters.

- **City Bombing (Fair):** While bombers have a 50-percent chance of successfully bombing a city, that still means that they have a 50-percent chance of dying in the effort. Still, bombers are the aircraft of choice for this mission because they will cause maximum damage to an enemy city when they do hit it. The next section has all the details.

Bombing Cities with Air Units

Air units bomb cities (i.e., conduct air raids against them) in a manner different from all other types of attacks. As the air unit is given the order to attack (move into) the city, a random target in the city square is selected (including the city itself, which means its current production and, against bombers, 10 percent of its current production efficiency as well).

In this instance, random means that each unit in the city, plus the city itself, all have an equal chance of becoming the target of an air raid. For example, if four units were a city, each of these five potential targets (the four units plus the city itself) has a 20-percent chance of being selected as the actual target of the bombing attack.

The city defends with a strength of two, giving it a base 50-percent chance of destroying an attacking bomber and a 67-percent chance of destroying an attacking fighter (this is according to Table 9.1) before any player's combat handicaps are taken into consideration.

If the city fails to destroy the attacking aircraft, the aircraft hits the randomly selected target. If it was an enemy unit, it is eliminated by that single hit. Note that enemy ships (damaged and undamaged) can be very easily destroyed in port in this manner. (For a good example of how devastating this can be, watch the Japanese attack on Pearl Harbor at the beginning of the World War II scenarios, and see how many American battleships get destroyed by a fully pressed aerial attack.)

If the randomly selected target was the city itself (which is automatically the case if there are no other enemy units in the same square as the city), any partially completed unit being produced there is destroyed. Any production continuity bonus is also lost (meaning it will take the

longest time possible to rebuild that unit). Furthermore, if a bomber hits a city, it will destroy 10 percent of its production efficiency as well. See Chapter 10 for all the details of economics in *Empire Deluxe*.

The Aerial-Loitering Technique

As mentioned previously in this section, the way to get the best odds for your air units attacking enemy ships is *not* to attack them, but instead to loiter around adjacent to them in the ocean and hope that they will attack your air units instead. It is important to note that airborne planes do not have to move on a given turn (which can be useful if they are protecting your transports). Instead, you can just skip their turn, as you can with other units. In skipping a turn, however, an air unit will have spent its entire turn's worth of movement in that square and will still be one turn closer to needing to land and refuel.

Occasionally, it can be useful to throw out a gauntlet of airplanes to block, physically, enemy sea movement with the threat of forcing them to make risky attacks against those planes. This is particularly useful for keeping enemy transports from closing in on one of your ports.

In Figure 9.2, the lightly shaded units have scrambled fighters to block the advance of the enemy transport as it moves northward. The transport's odds of winning a battle are terrible, should it try to attack one of them.

> This loitering technique also works well with the "Sit Down and Shut Up" defensive technique, discussed toward the end of this chapter.

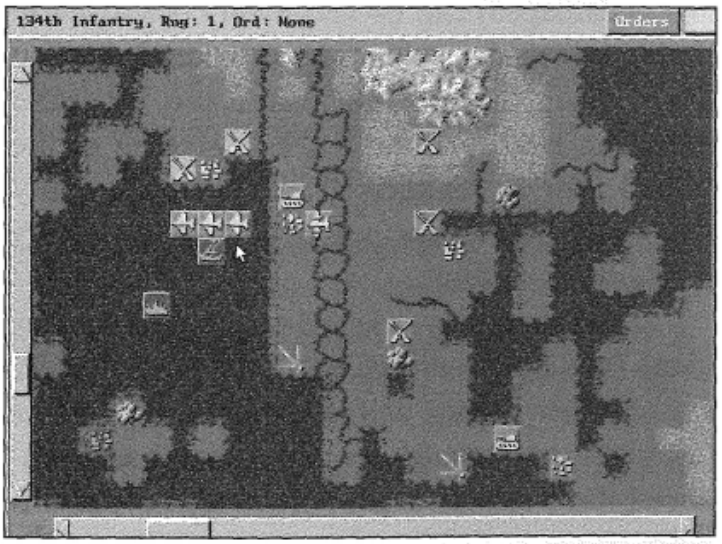


Figure 9.2 The airplane-loitering technique

The Air Force as Cavalry

Because of their speed, airplanes are well suited to be rapid reinforcements for a newly opened battle area. In other words, they can often serve as the "cavalry to the rescue," and will be among the first to arrive at a fight. In this role as the cavalry, airplanes can often play a decisive part in the early part of an invasion battle. Because of the speed with which they can reach an invasion site, they are often employed in emergency air-to-ground attacks, either securing the beaches (for the invader) so that inland cities can be taken or destroying the invaders before they can move inland (for the defender) so that cities there can be protected. As previously stated in this section, however, when used in this air-to-ground combat role, airplanes tend to have a very high mortality rate.

EVERYTHING ABOUT NAVAL UNITS IN COMBAT

Since half the pieces available in the game are naval unit types, it is easy to think of *Empire Deluxe* as, primarily, a naval strategy game. This assumption can be supported by the fact that

most randomly generated maps will be filled with several small landmasses and few tremendously large ones. A game of *Empire Deluxe*, therefore, will often resemble the World War II campaigns in the Pacific. There, amphibious landings and fleet maneuvers were the primary order of business (whereas in Europe, land campaigns dominated the action).

Since *Empire Deluxe* is a game that is won by controlling cities, and cities can only be captured by land units, your fleets have only three main objectives. The first is to protect your armies, both when they are on shore and when they are being transported across the seas. The second is just the opposite, to harass the enemy's armies, both when they are on shore and when they are in transports. The third is to dominate the oceans so that your fleet has maximum freedom of operations and your enemy's ability to project seapower is restricted. Every application of your naval strength, therefore, must be aimed at securing one of these three goals.

Important Facts About Naval Units

- Land units are entirely dependent on transports to ferry them across the water, so the loss of transports greatly effects an army's ability to maneuver. You can severely hinder other players by making transports your top-priority naval target. Conversely, take great care to protect your own transports against enemy attack.
- Land units are particularly vulnerable to shore-bombardment attacks, so use your cruisers and battleships to make such attacks liberally. However, land units are not so bad when they take the initiative and attack adjacent ships (see Table 9.1). Therefore, keep the rest of your navy away from enemy tanks and infantry.
- It is the opposite case when using ships against enemy air power. As seen in Table 9.1, ships are at a disadvantage when they attack air units. Conversely, when air units attack ships, the ships' chances of winning greatly improve. Therefore, strive to sail *around* the enemy's air force, not through it. Make him risk his planes in air-to-sea attacks. Don't accept the poor odds offered in sea-to-air attacks if you can avoid them.
- Naval warfare is a war of repairs. In battles involving a ship versus anything, a ship generally wins. This is because ships can absorb a lot more damage than land and air units can. In ship-to-ship combat, a ship always wins; the surviving ship, however, will often have suffered damage from the battle. Ships that have suffered 50-percent or greater damage have their attack ratings halved. Therefore, to ensure their survival in future battles, keep your ships repaired and never attack with a crippled ship! It is generally safe to continue operating with a cruiser or carrier that has one or two hits, while a battleship can still roam around with upwards of four damage, but even if that small risk can be avoided, it should be. Undamaged ships have the greatest chance of surviving a battle, and that is always what you want whether attacking or defending.

Transports

Not surprisingly, transports are the worst ships when it comes to any combat situation. Consequently, you should never attack with them unless there is some kind of bizarre chance meeting between your empty transport and a (potentially) full enemy transport in the middle of nowhere. That is about the only case where you might want to roll the dice and attack with a transport.

As you've learned in every tutorial, transports are how armies get from one landmass to another. Without them, armies can't get where they need to go and the game cannot be won. Transports always seem to be a player's transportation bottleneck, and this, combined with their inherent vulnerability, means that one can never have enough of them. Consequently, you must strive to protect the ones you have and enlarge their numbers by continually producing more of them.

A transport takes 30 turns to produce, can sustain three damages before sinking, moves two spaces per turn, and has a cargo capacity of six infantry units. (Each armor unit counts as two infantry units in terms of cargo space on a transport—thus, three armor units would fill one transport.) When fully loaded, a transport represents an investment of 66 turns (30 for the transport + 36 for the cargo). That is a lot of yolks for one fragile little eggshell, but this is how troops get around the oceans in *Empire Deluxe*.

Each hit a transport takes reduces its carrying capacity by two infantry units (or one armor unit). Consequently, a single hit will reduce its cargo capacity to four infantry units. Two hits knock its cargo capacity down to only two units and reduce its speed to one square per turn. Therefore, it is vital to keep your transports in full repair!

Destroyers

There are three primary uses for the fast, weak little destroyers. First, they make fine exploration units, clearing away blackened sea and coastal squares with ease due to their high movement rate of three squares per turn. (This movement rate drops to only one square per turn for crippled destroyers, however.) Second, since they are faster than transports, destroyers can catch up to them as they flee and, in battle, will usually come out on top over transports.

Finally, destroyers can spot submarines in adjacent squares. This makes them useful for patrolling areas where you fear enemy submarine activity (straits, capes, convoy routes, etc.). It also makes them good escorting ships, although a cruiser is usually better suited to that role. This is because submarines are more likely to come out on top after a one-on-one battle with a destroyer (see Appendix B).

Cruisers

Cruisers should be thought of as your light-marauder-ship type. While not as fast as a destroyer nor as powerful as a battleship, cruisers can perform two tasks that each of these individual ship types specializes in.

Like destroyers, cruisers can spot submarines from an adjacent square. In a stand-up fight, however, a cruiser can whip a submarine, destroyer, or transport most of the time. For this reason, they make better escorts than destroyers do. The down side is that they are not as fast as destroyers (moving only two squares per turn to the destroyer's three) and take 50 percent longer to build (36 turns to a destroyer's 24).

Like battleships, cruisers can bombard adjacent enemy land units. Bombardment attacks highly favor bombarding naval units, so you should make liberal use of them. Although cruisers do not have the staying power of battleships when marauding the enemy's forces (taking eight hits to destroy versus a battleship's twelve), cruisers only take a little more than half the time a battleship does to produce (36 turns to a battleship's 60), so it is possible to get more of them built in a given amount of time.

Battleships

Battleships have one purpose in *Empire Deluxe*, and that is to hunt down and destroy enemy land units and ships. Like other naval units, they should avoid attacking enemy airplanes but, if undamaged, shouldn't hesitate to go after any unit smaller than they are. Keep these behemoth marauders in repair, and let them wreak havoc on the enemy at every opportunity.

Because of their long production time (60 turns), however, battleships are not easily produced in quantity. Finding a port with a production specialty of battleships (and a high production efficiency to go with it) is a real treasure. While they have considerable value in combat, do not overestimate the survivability of your battleships. Consider your *opportunity costs* before building several of them at a time (as explained in next chapter's Table 10.2).

Carriers

An aircraft carrier is really only as good as the fighters it carries, so its missions are pretty much limited to those which fighters perform (see the section on fighters earlier in this chapter). By allowing fighters to project their mission from these floating air bases, they can extend their discovery and sighting capabilities to the furthest reaches of the map. Having fighters at sea is also a means of dealing with enemy air power when it approaches your fleet.

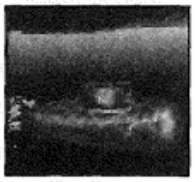
Generally, a carrier doesn't have much use when operating as a lone wolf ship. One exception is when it is on exploration duty with several fighters on board, early in the game (before the seas are fraught with large enemy fleets). Also, a lone carrier can sometimes serve as a useful floating air base for staging fighters across a vast body of water.

Carriers, however, are generally considered a supporting-ship type and operate best when working together with other ship types. This forming of naval units into *task forces* made up of a variety of ship types affords each ship the mutual protection of the others. Carriers can offer a task force something very special—air cover and long-range sighting capabilities anywhere it goes.

When building an aircraft carrier, don't forget to build a contingent of fighters to put aboard it. In the time it takes to build one carrier (48 turns), another city could produce four fighters to sail with it (at 12 turns each). Two cities could produce a carrier's full complement of eight fighters by the time the ship launches (see Chapter 10). Thus, it is wise to have a carrier-building city working in tandem with a fighter-building city or two.

Although they take eight hits to sink, carriers have an attack rating of one, so they should never bother to attack an enemy unit. Like transports, which also have an attack rating of one, they are not halved when attacking enemy air units. Still, the carrier units themselves shouldn't be too hasty to attack enemy airplanes. After all, shooting down enemy airplanes is one of the reasons why they bring fighters along, isn't it?

Submarines



Submarines are the stealthy observers and hunters of the deep. While they are extremely vulnerable when attacked (with their one-strength defense rating and requiring only two hits to sink), they can be deadly on the attack since each hit they inflict causes a three-strength damage to the enemy.

To compensate for their vulnerability when

attacked, submarines are very difficult to see. Only destroyers, cruisers, and submarines can see an adjacent enemy submarine unit. Other ship types and airplanes will discover a submarine only by accident when they try to move into its square. However, once sighted, submarines will remain on the other player's old sighting reports for the full three turns (see Chapter 7).

Submarines, themselves, can see all adjacent enemy ships, but not adjacent enemy land or air units. Therefore, their best tactic is to wait patiently along sea routes that are likely to be traveled by enemy ships. When juicy targets appear next to them (particularly transports), they should pounce like wolves to attack them.

STRATEGIC TERRAIN: INTERACTION POINTS

Certain key terrain features can serve as interaction points between land and sea units during play. There are junctions between bodies of land and oceans that present some intricate movement challenges. The solutions, however, are combat related, and so we have covered them here.

Ports

The first major interaction point is every port city on the map (and there will be many of those). Since ports are meeting places for all three general unit types (land, air, and sea), and players can stack an unlimited number of them in each, port cities become the launching point for most major offensive operations in *Empire Deluxe*.

When considering engaging the enemy, weigh up the location of battle by its proximity to ports (both friendly and enemy). It is at nearby ports where repairs are easily made and where reinforcements will generally arrive. Know that the player closest to a secure, friendly port goes into battle with a considerable geographic advantage. Therefore, try to choose a battleground where *you* will be that player.

The value of a port city might be degraded, however, if it is not secure (i.e., if the enemy is threatening to take it any time soon) or if it is positioned poorly on its landmass. By being poorly positioned, we mean if it is on a wrong-facing beach or only connects to an inland estuary where enemy land units could come between your ships and that port.

Diagonal Land/Sea Passages

Where land and sea routes meet by opposite diagonal connections (see Figure 9.3), the opportunities for land/sea combat are inherently good. The likelihood of land and sea units colliding at such an intersection increases with the size of the landmass on either side of it. In other words, for land units, the more cities there are on either side of the landmass, the more vital

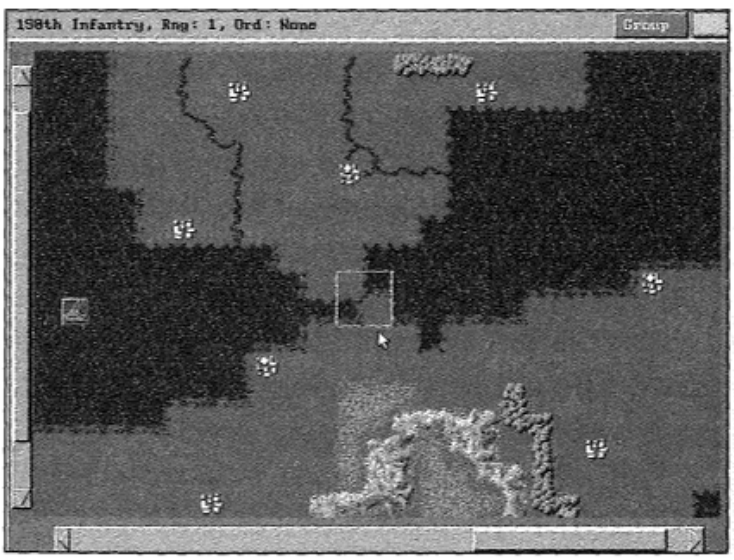


Figure 9.3 The section highlighted is an example of a diagonal land/sea passage. Due to the large size of both the landmasses and the oceans it connects, this will be an important junction to control.

becomes the passage. For naval units, the importance of a passage increases in proportion to the amount of time they save going through it as opposed to going around it.

These intersections will quickly become killing zones when they are contested. Ships, in particular, are able to interdict these points easily. Battleships and cruisers will make mincemeat of enemy land units crossing these narrows by bombarding them. Conversely, land units will often find ships to attack along the shore lines. Submarines, too, work well out of these areas, cutting enemy ships down as they come through the passage. Even airplanes will seldom want for targets in these areas. The carnage at a crucial land/sea passage can be tremendous, but such a passage is often strategically located terrain worth paying for.

Canal Ports

When is a port more than a port? When it is a *canal* city. A canal city is one that controls an overland connection between two oceans. The canal city is placed so that it dominates the access between both the two landmasses and the two oceans that meet there. Your starting city in Chapter 3's second tutorial scenario, for example, was a canal city. Other (admittedly contrived) examples of canal cities are shown in Figure 9.4.

Of the four canal cities pictured in Figure 9.4, the one on the left is the strongest because neither land nor sea units can cross without first conquering the canal city itself. (Its strength is visually represented in this illustration by the four infantry units above it.) The next one is the second strongest since no ships can pass through without control of the canal city (although land units could slip by).

The third canal city shown in Figure 9.4 is weaker yet because ships can pass right by it

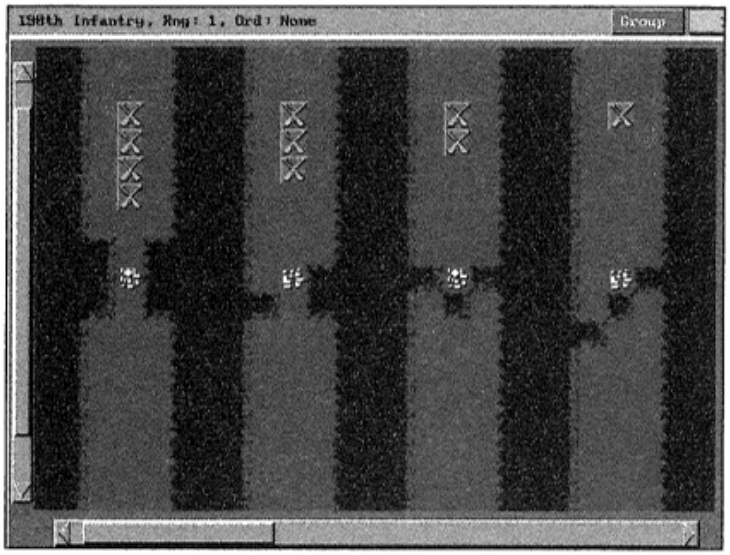


Figure 9.4 Four fingers of land with canal cities

(however, land units must control the canal city itself to cross there). The last and weakest canal city (symbolized by the single infantry unit above it) allows both land and sea units to get past it. Even this weakest canal city, however, if garrisoned, can still challenge any enemy unit that tries to pass nearby.

While canal cities are similar in their strategic nature to the diagonal land/sea passages described above, they have one major tactical difference—players will want to control that canal city and not just the water around it. This is emphatically the case if ships cannot cross the landmass except through the port itself. If a canal city is located in a contested area of the map, expect numerous battles to focus on it. The strategic significance of canal cities can be tremendous when they dominate key travel routes.

GENERAL COMBAT TACTICS, TIPS, AND TECHNIQUES

What follows in this section is a comprehensive collection of ideas that will help you to control an objective once the shooting starts around it.

This list is not exhaustive. New players always bring with them new insights and new tricks, but we're presenting all of the basic combat tactics and a few fancy techniques of our own devising to get you started. Also, many nuggets found in other chapters and the tutorials have been consolidated here for ease of reference.

This first section is filled with general techniques that apply to all occasions. Specifically, it will help you group your pieces together effectively for combat-efficient moves, and remind you which battles you should fight and which you should avoid.

Combined-Arms Operations

If you are going to contact the enemy and engage him in battle, it is wise to bring along every tool in your toolbox. As events unfold, you will find that a situation will arise where an armor unit could have decided the battle, had you brought any—or a battleship, or bombers, etc. The point is that you will not know exactly what unit types might prove of critical importance over consecutive turns of battle. You must *be prepared*, as the Boy Scouts say.

Therefore, arrange your units so that they are grouped together in *combined-arms* forces. This means to form groups that have the proper balance of each unit type for the task assigned them. Each unit type has a specialized function in battle. It supports the other unit types with its strength while they protect against its weaknesses.

Making sure you have the right units available when and where you need them in battle is the essence of combined arms operations. Having combined arms gives you the advantage of always being prepared with the right tool (unit type) to do the job. Battles are won by the general who brings the most advantages to battle and employs them the most effectively at decisive points and times.

Task Forces

The term used to describe a combined-arms naval grouping is called the task force. Forming a task force not only means having ships of various types moving together at sea, it also means deploying them properly in that group. While early in the game you won't have a navy large enough to form effective task forces, eventually your navy will increase in size. When it does, effective grouping into task forces becomes important.

Naval task forces are composed of two elements: an inner core of ships that are the prizes being protected, and an outer ring of ships that are protecting them. They are given missions to perform based on what ship types compose the inner core. Some examples of these missions are listed in Table 9.4.

Generally, the outer ring of a task force is composed of the other three unit types. Destroyers, in particular, make excellent escorts since they function well as an early warning unit, even against enemy submarines. Cruisers and submarines, too, have their place as escorts to the core-ship types, and using them in balanced groups (i.e., forming combined-arms task forces) is an effective way to deploy them.

Try to form your outer ring of escorting ships so that the core ships are best protected. Generally, this means keeping the strongest contingent of escorts leading the core, with adequate protection on either side of the core and very little to its rear (after all, it is difficult for an enemy to catch up to a task force moving full steam ahead at the rate of two squares per turn).

Forming ideal task forces is not always possible, however. Often, you will have to make due with whatever ships you can muster. Still, the principle remains intact—combine your ships into groups whenever possible and organize them for their mutual protection. You will find that computer players do not properly escort ships or

TABLE 9.4: TASK-FORCE MISSIONS

INNER-CORE SHIP TYPE(S)	MISSION
Transports	To run a protected convoy to its destination
Carrier	To perform reconnaissance and map discovery
Battleships	To conduct surface combat or shore bombardment
All three types	This is a proper combined-arms grouping for a major amphibious assault (invasion).

form task forces. Often, this works to their great detriment, affording human players a weakness to exploit, and is a key to defeating them.

Carrier Timing Techniques

When an aircraft carrier is operating fighters from its deck, it will occasionally happen that the ship will go one way and the planes will go the other. This can result in fighters ending up too far away to return safely to their carrier with their remaining fuel. Often, there is no friendly air base nearby and the fighters are destined to crash.

To help avoid this loss of aircraft by oversight, *move the aircraft carrier before moving its fighters on each turn*. Then, when moving its fighters, keep an eye on the carrier to make sure that they do not stray too far from it. Alternately, an easier method is simply to fly your fighters one turn out from the carrier and order them Home ([H]) on the next turn. It will reduce the effectiveness of your fighters by consciously shortening their operating range, but at least you'll never lose one from accidentally moving it past its safe return range.

Note that when fighters on an aircraft carrier are assigned to patrol missions, they are never in danger of running out of fuel. This is because the computer counts each square of the leg out as two squares, and will not let the airplane venture more than six squares away from the carrier when patrolling. Thus, no matter where the carrier moves, the patrolling fighters will always have enough fuel to make it back to their ship.

The Attacker-Advantage Situations

There are some attacks that you can make where the odds will be naturally in your favor. These attacks should be made whenever the opportunity presents itself since they should cause disproportionately higher losses to the enemy. Because *Empire Deluxe* is largely a war of strategic attrition, inflicting more losses than you sustain is an important general goal. (Even more important is that you produce many more units than you lose—see Chapter 10.)

Based on the information presented in Table 9.1, these are the combat opportunities where the odds will naturally favor the attacker. Consequently, you should always strive to take advantage of them:

- Your fighters should attack enemy bombers.
- Your ships should bombard enemy land units (particularly air bases) that are not in forest- or mountain-terrain squares.
- If your land units will be subject to enemy shore bombardment, move them safely inland. Failing that, either attack the enemy naval units with them or move them to a coastal forest- or mountain-terrain square, and brace yourself. Remember, bombarding enemy ships often portend invasions.
- Submarines should always attack and never defend.

The Attacker-Disadvantage Situations

There are certain other combat situations where the odds are stacked against you should you take the initiative and attack. These attacks should be avoided at all costs since you are very likely to lose them. Based on the information presented in Table 9.1, here are the combat opportunities you should avoid:

- Never attack with a transport. The only exception might be to use your empty transport to attack an enemy transport in hopes it has cargo aboard (so that the enemy will have more at risk in an even-odds attack). This is an even more attractive option if the transport is obviously heading for your shores, since that increases the likelihood that it is carrying invading land units that need to be stopped.
- Don't attack with your carriers. Because they can take a lot of damage, they might survive, but their attack rating is so low that they'll probably be much the worse for wear.
- Never attack enemy fighters with your bombers.
- Never attack with crippled units (i.e., ones that have sustained 50-percent or more damage). This is particularly true for crippled armor units because of their handicap in land battles and the fact that they are very quick to fix anyway.
- Avoid risking your fighters in city-bombing missions. The exception would be if you have no bombers handy to attack an enemy port that you know contains some tempting enemy ships.

When you find yourself in these situations and your units cannot escape the enemy, let them attack you. Use the aerial-loitering technique (explained earlier in this chapter) with all your unit types, and wait the bad guys out. The odds are always better for you if, when you can't flee, you wait these particular combat situations out and let the enemy come after you.

OFFENSIVE AND INVASION TECHNIQUES

When it is time to bring the war home to the enemy, there are certain things to remember, discussed next.

Look Before You Leap

If you are going to make an informed strategic decision based on the principles of war learned in the previous chapter, you must have reliable information about the enemy. This means that you should probe the enemy with aerial reconnaissance to gauge his troop strength in the areas you are considering attacking. Spy on his cities to refresh your memory what their production efficiency and specialties are and what they are producing.

Only when you have current intelligence of the enemy's dispositions can you form a correct

strategy. Remember the principles of war. Threaten what the enemy values, and attack where he is not defending.

Amphibious Assaults

When we say *amphibious assaults*, we mean the initial landing of troops on an enemy landmass. A small island (defined as one that has no more than three cities on it that are fairly close together) can often be overwhelmed and captured with a single amphibious assault of one to three loaded transports plus some supporting ships and airplanes. Larger landmasses will require more extensive efforts and will be discussed a little later in this section.

When establishing a beachhead on an enemy-controlled landmass, it is best to try to capture a port as part of the initial assault. This will provide a refuge and repair facilities for friendly ships, an air base for your planes, and a landing point for convoys of land-unit reinforcements. The key, therefore, is to begin an invasion with the conquest of a port city.

To that end, it is best to lead off an attack on a port city from a transport with infantry units in preference to armor units. This is because, even if an armor unit takes the port without losses, the infantry unit that it generates there as change will be stuck in the newly conquered port city (and, therefore, vulnerable to loss should the city be retaken immediately). Whether the armor unit succeeds or fails, you've lost a good exploitation land unit (i.e., one that moves two squares per turn). By letting the infantry take the losses for capturing the invasion's objective port, the armor units will be free to roam through the city and onto another square, making the port more securely held and more rapidly threatening other enemy cities on that landmass in the process.

When hitting the beaches from a transport against a nonport square, the opposite is true. Lead with the armor units to allow them maximum freedom of movement on the turn when they land. Otherwise, the land squares next to the transport are likely to be filled with infantry units blocking the armor units' preferred movement routes. Use the Wait command to move your units in the desired sequence. Remember, armor units can attack the second square inland on the turn when they invade (if the terrain is appropriate). Therefore, enemy cities and air bases located one square inland can be taken on the same turn that armor units hit the beaches near them.

In Chapter 6, you were taught that transports will not make use of the Unload ([U]) command after having made their move for that turn. Therefore, it is vitally important for you to manually awaken their cargo and get them moving onto the beaches right away. As you'll recall, we suggested that you combine a Group Move command ([F7]) with Clear Orders ([Insert]) to awaken ship's cargo for immediate movement on that turn. Failure to do so would mean unloading your transports on the turn *after* they reach the beaches, putting you a turn behind schedule and leaving valuable land units aboard a vulnerable transport next to the enemy's territory.

A transport full of fresh troops has a 98.4 percent chance of capturing any single enemy city. This is the same whether it is carrying six infantry units, three tanks, or some combination of the two—as long as the armored units are undamaged and the transport is completely filled.

Note that if the transport ends its move next to an enemy city or unit, it automatically wakens the land units on board until the adjacent enemies are removed. However, once there are no more adjacent enemies, those units will go back to sleep, so you'll still have to wake them as previously described if you want to put them ashore on this turn.

Sounding the Cavalry Charge

As previously stated in this chapter, your air force, due to its speed, is well suited to the role of rapid reinforcement in a newly opened battle area such as an invasion site. In this role as *cavalry*, airplanes can often play a decisive part in the early part of an invasion battle when employed in emergency air-to-ground attacks to help secure the beaches. Remember, though, when making these ground attacks, that airplanes will tend to die very quickly.

Coordinated Air Support

Naturally, when invading, you will want to take special care to coordinate the arrival time of your fighters and bombers with your transports and land units. Under optimal circumstances, they must spend no more than half their fuel to reach the invasion site (giving them a return ticket home—in case the invasion should fail, or a new base for them to operate from is not immediately created). If you want to stage airplanes to a beachhead as rapid reinforcements, make sure that they are no more than half-way there before the issue of whether or not they'll have a place to land when they get there is decided. That way, if the invasion doesn't go well, they can simply fly back to their original bases.

Sailing Your Transports into a Newly Captured Port

There are two types of benefits to sailing your transports into a newly captured port, if the port city is *secure*. (Secure means that there are no enemy land or air units nearby that can capture it or bomb it repeatedly. Security, however, is a relative term, and having units in a city [particularly ships in port] is always a calculated risk.)

The first benefit is that your transports can hide in that newly captured, secure port city if nearby enemy ships are threatening them. Since ships cannot attack a city square, any transports you have hiding there can await a relieving fleet to come and rescue them.

The second benefit of this move concerns sailing right in with loaded transports. After the transport lands at a port, it automatically wakes their cargo. This has the added benefit of getting those land units one square inland before they conduct their own movement for that turn.

The Transport-Surprise Port-Invasion Technique

Since cities have a sighting range of two squares in the Advanced Game of *Empire Deluxe*, sneaking up on them requires care in your offshore, preinvasion deployment. The trick is to keep your transports three squares away from the enemy port/invasion site and then charge them in two squares to the landing site without being spotted on the turn before. If you fail to do so, and there are enemy warships in that port (or even nearby), they will certainly sail out and attack your transports, probably before you can offload their cargo.

For example, in Figure 9.5, you can see that

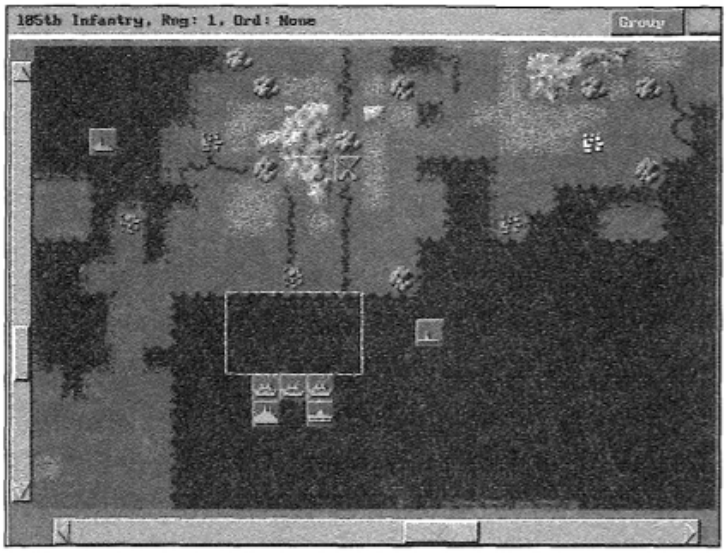


Figure 9.5 The box highlights the spotting-danger zone from the city about to be invaded.

one player is preparing a surprise landing. Notice that the three transports are beyond the other's port-sighting range (as shown by the Group Move box in the ocean between them). The invading player will, therefore, be able to sail up next to the defender's port in one turn with the transport's two-square movement and attack right away, without any warning whatsoever. This is a good illustration of the transport-surprise port-invasion technique. Use it regularly.

Invading Large Landmasses

While the above techniques for amphibious assaults will get you ashore and help you to capture and secure a port city from which to begin your conquest of that landmass, unless it is a small island, it will be difficult to overwhelm it quickly with your initial landing forces. Large continents with many cities on them will require obtaining an initial local superiority to secure a beachhead, followed by plentiful reinforcements to push out from the invasion site and win the land campaign for its undisputed control.

Therefore, consider the conquest of a large continent to be a war of logistics. While the enemy produces land units there and sends reinforcements to it to crush your beachhead, you must reinforce your invasion as rapidly as possible. In other words, the *battle of the beachhead* is a race to see who can get the most units there the fastest. It is a delicate time for the invader, who must hold on until he builds up enough strength to really press the enemy on land.

This build-up of ground strength must be done by either sailing land units in through the port initially captured or by launching subsequent, supporting invasions on that same landmass. Enemy counterattacks while the invader is weak (usually just after the initial landings) must be withstood.

Logistically, therefore, it is wise to invade with land units from far away and mass as many other troops as possible at a location (particularly a port) as near the invasion site as possible. These units will be sent in as rapid reinforcements. Shortening the distance between your reinforcements and your beachhead will decrease the travel time that your transports must spend ferrying them in. Also, increasing the number of transports involved in this sealift operation will not only allow you to increase the initial mass of your invasion force, but also to increase the rapidity that reinforcements can be brought ashore. Remember, you will seldom have all the transports you could wish for at times like these, so plan accordingly.

Invasions of large continents will be decided, ultimately, by who can get the most troops there the fastest ("Getting there firstest with the mostest," as Nathan Bedford Forrest put it). As you learned in the previous chapter, force equals mass times velocity. Mass your troops on the enemy continent as rapidly as possible, and *the force* will be with you.

Knowing the Transport Bottleneck

We can't stress enough that transports are the key to troop mobility. Having said it before, we are stressing it again here, that reducing the enemy's transport capacity reduces his offensive options and renders his defenses less flexible (since he will not be able to rush land unit reinforcements to a desperate battle across the sea). You should always strive to cut the sea legs out from under the enemy and thus reduce his flexibility. Computer opponents especially, play a vulnerable game by building only a few transports to support their empires. When you have the advantage in transport mobility, use it to outmaneuver your opponent and to strike him effectively according to the principles of war (see Chapter 8).

DEFENSIVE TECHNIQUES

In the previous chapter, you learned that there are two goals to setting up a good defense. The first is to make an enemy's offensive action hazardous and costly, thus either forcing him into certain danger or sending him into inactivity to avoid it. The second goal of defensive warfare is to provide a secure platform from which to eventually conduct your own offensives.

Basically, where you are not attacking, you are defending. Where the enemy is attacking you, your defense is contested. The following suggestions will help you to prepare a defense when it is uncontested and to react properly with your forces when it is.

"Sit Down and Shut Up"

As units engage each other in battle, there are times when you should simply let the enemy attack your units, instead of moving your units onto the enemy's. All of this is shown in Table 9.1, but there are three cases when, should you find your units next to the enemy's, you should *not* attack. Instead, let the enemy attack you. These three cases are:

1. When yours is a land unit in defensive terrain and the enemy unit is not infantry.
2. When your unit is a ship and the enemy is an airplane. (This means denying the enemy the advantages of using the aerial-loitering technique, discussed earlier in this chapter, by simply refusing to play ball.)
3. When your unit is crippled (i.e., has sustained 50 percent or more of its damage rating) and cannot escape. That is because it is better to go into combat using a unit's full-strength defense rating rather than its half-strength attack rating.

Repairing the Odds

Crippled units should leave a battle area and make their way back to a city for repairs, period. Granted, it might be tempting to use every drop of strength from a tank, battleship, or cruiser in a desperate battle far from a friendly repair facility. When that is the situation, however, it is time to consider a general withdrawal and simply cut your losses. If the enemy can keep his units in repair while you cannot, that creates a battle of attrition that he can win. Plan your campaigns with nearby repair facilities in mind and use them whenever you have damaged units. Having ships in a nearby reserve, ready to take over a damaged ship's mission while it is out for repairs, would be ideal.

The Airplane Terrain Defense

Land units cannot attack airplanes that are on ocean squares and naval units cannot attack air-

planes that are on land squares. Therefore, when an airplane can be attacked by one of these two types of units, you can prevent the enemy from attacking it by ending its move over the terrain type opposite the type occupied by the potential attacking enemy unit.

The Two Pillars of Defense

Preparing defenses requires two things. First, you must have some warning that the attack is coming, lest you give the enemy the advantage of surprise. Second, you must have sufficient forces nearby to deal with enemy incursions quickly.

To avoid being surprised, set up patrols. To have the strength nearby needed to repel enemy activity, form react forces.

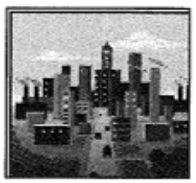
These two pillars of defense are your blueprint for fulfilling the ninth principle of war: security. Although they were first discussed in Chapter 4's third tutorial lesson, you should refer back to Chapter 8 for the specific "how tos" of setting up your patrols and react forces. You will find them under the ninth principle of war, security, and we will not repeat the details again here.

A Cavalry Charge on the Beaches

Because of their speed, airplanes are well suited to be your fast-reaction troops in a newly opened battle area. They can serve as "the cavalry to the rescue" to reinforce sparsely defended invasion sites. This will allow you to put up some immediate resistance while an invader is still weak, and give you time to mobilize the rest of your reaction forces.

In this role as cavalry, airplanes can often play a decisive part in the early part of any invasion battle. Consider employing them in emergency air-to-ground attacks to destroy invaders before they can move inland and threaten your other, nearby cities. Try to demoralize an attacker early by eliminating his invading troops as quickly as they land. Be aware, however, that these are likely to be kamikaze attacks since, in their ground-attack capacity, airplanes have a very high mortality rate.

How to Defend a City Against Land Attacks



Since cities are, generally, the most important objective in *Empire Deluxe*, it is important to know not only how to attack them, but how to defend them as well. Interestingly, it is often easier to attack a city than to defend one.

When your city is attacked by enemy land units, it defends itself as if it were an infantry unit. (This is because you have an imaginary army inside the city, garrisoning it, placed there when you captured the city and keeping it your color all the while.) *Any units you have inside that city will not improve its defense strength against an enemy land attack, and, if the city loses the battle, every unit in it is automatically eliminated.* Therefore, the only way to defend a city is never to allow the enemy an opportunity to attack it in the first place.

Units in cities have never had any positive effect on a city's defensive abilities. This is simply part of the rules of *Empire*, dating back to the original game, and there are both advantages and disadvantages to stacking units in cities. Experience in the old Empire game showed me that handling it any other way bogged down the game.

—Mark Baldwin

The surest way to keep enemy land units from attacking your cities is to attack them (and transports they might be on) before they are close enough to attack your city on their next turn. Since cities have a sighting range of two squares under the Advanced Game rules, enemy land units marching overland will always be seen before they can close in. Enemy transports, however, might be using the transport-surprise port-invasion technique described above, so you simply must remain vigilant and patrol against this particular move.

Players of the old *Empire* game have long used the tactic of placing a cruiser or battleship (e.g. a *heavy ship*) in their port cities to help defend them. While these ships are effective defenders (they can sail out and attack observed enemy transports or shore-bombard land units next to their port), they are much more vulnerable in the Advanced Game of *Empire Deluxe*.

Besides being at risk from an enemy using the transport-surprise port-invasion technique or a swarm of enemy infantry units attacking over land, now enemy armor units can move in and attack a port from two squares away before a heavy ship will have a chance to react by bombarding it from inside the port. Furthermore, ships in port are extremely vulnerable to enemy air attacks. And, should the enemy capture ports defended by having heavy ships inside them, those ships will be lost as well.

Therefore, these heavy ships must evacuate their ports when these dangers loom. They can continue to defend a port city from outside its square by shore bombarding enemy land-units as they approach along coastal land squares. Alternately, they can park just outside a city and watch the enemy land-units obligingly attack them (although this can be risky for the defending heavy ship).

Leaving airplanes based in a city that is the object of an enemy attack, naturally, places them well for its defense. Airplanes should be used in ground support attacks to remove the immediate threat to a city, particularly the one they are currently operating from, lest they die automatically if their city falls and they have no other place to rebase.

Always take care that you do not lose additional units when the enemy captures your cities. Evacuate a city and try to cut your losses if you feel it is doomed to be captured.

How to Defend a City Against Air Attacks

Short of engaging an attacking airplane before it bombs your city, there is little you can do to prevent an enemy from bombing you. Therefore, keep those pickets and patrols out, and have fighters at the ready when the enemy air force approaches your city.

The important thing is to protect any ships you have at a port city. Since they are so easily destroyed by an air attack there and are selected randomly from the units at that port, there is only one defense—stuff the city with other units (particularly cheap land and air units) so that the odds of an enemy air attack randomly selecting your valuable ships are reduced. Therefore, when the enemy's land units approach, scatter your units from the city they threaten; when their planes approach, concentrate your units in it to reduce the chance of an important ship or the city itself becoming the target of impending air attacks.

THE COMPUTER'S LUCK FACTOR

As we mentioned in Chapter 6's section on the waiting-bookmark-unit technique, luck in *Empire Deluxe* is fixed in the random-number

seed. Consequently, it will always average out. However, the human psyche being what it is, players will often want to tempt their luck and even cheat to avoid ill fortune. If we are describing you, please consider the following.

Do You Feel Lucky?

Do not make multiple, consecutive attacks with your units (particularly your air units), thus pushing their luck, if their survival is important to you. Eventually, luck will run out and your unit will die. Strangely, the computer players recklessly do exactly this when attacking cities—attacking repeatedly until the air unit is finally destroyed.

This is because, to the computer's artificial intelligence, these attacks make sense. And so they do, if one is a cold, calculating machine. Human players, like yourself, however, are creatures of feelings and emotions. Sometimes you just have to play your feelings in these situations and decide whether or not to press your luck.

The Instant Replay Cheat

> This feature was done by design. While it [saving the random number seed] is not perfect, the saved game is designed to produce consistent results upon reloading in such a situation. You're going to have to find a more creative way to cheat [grin].
>
> —Bob Rakosky

> What we use is what is known as a pseudo–random-number generator. This generates random numbers right at the start of the game, and it gets saved when the game is saved. It means that although the numbers are random, we can reproduce them. The idea is to have reproducibility and prevent someone from retrying battles over and over until they win.
>
> —Mark Baldwin

This was described in Chapter 6 as part of the waiting-bookmark-unit technique. Basically, by saving the game, you can try to replay the previous turn and hope that the *die roll* (i.e., the luck element) breaks a little differently the second time around. (Activating the Auto Save feature from the File menu works well for those constantly wanting to retry their luck.) Although the random-number seed (or the future die rolls, if you will) is retained inside the saved game file (meaning that, if you restart it, the luck elements should come out identically), this does not always occur. It will vary if the screen begins over a different part of the map than where it was when the game was saved. (Don't ask us why, it's a programmer thing—but believe us, it works.) Of course, varying the sequence of your attacks also will work. There, you now have a couple "better ways to cheat."

Remember, When Fortune Favors the Enemy . . .

Many people are a bit paranoid about their bad luck while playing *Empire Deluxe*. Occasionally, there will appear to be invincible cities or unstoppable enemy units. Sometimes, a battle won will end up being ridiculously costly. Remember, you're not being cheated. This kind of thing happens to the other (even computer) players as often as it does to you.

Mollify yourself by recounting the great long-odds engagements in history. Think of what the USS Constitution had to endure in the process of earning the nickname "Old Ironsides." Look at the success a few Japanese planes had over Pearl Harbor. Consider the battle of Bastogne, "bastion of the battered bas-

tards of the 101st," and what some isolated and lightly armed paratroopers did to hold off a major German offensive in the winter of 1944.

There are many examples of long-odds victories in history. With all of the engagements you'll be fighting in *Empire Deluxe*, don't be surprised when you notice your share of them (particularly the ones that don't go your way).

BATTLE AFTERMATH

Winning the wars is helped by winning the battles, and the secrets to winning battles were taught to you in this very chapter. Coordinating units as they engage the enemy and finding the right matchups to improve your chances for success are the essential keys to victory on the battlefield.

Still, having units is one thing. Getting them is another. Since you can't win wars without troops, it's about time we looked at managing your economy. The next chapter is our own big production about *your* big production.

Building Up: Economics and Production

While it has long been understood that money makes the world go around, since the worlds in *Empire Deluxe* do not actually revolve, nobody seems too upset by the fact that there is no lucre in the game. Instead, cities will simply create new units over time. Although cities are already important military objectives for their basing, sighting, and repair facilities, these factors are often only secondary concerns when compared with their value as production facilities. While much in the previous chapters has dealt with how to use your units, this chapter tells you how best to acquire them in the first place.

THE BASIC ECONOMIC MODEL

When *Empire Deluxe* is played by the Basic or Standard Game rules, the economic model is very simple. All cities are created equal and produce units in the fixed amounts of time shown in Table 10.1. An individual city's production value cannot be degraded or enhanced, nor is there any penalty for having an abundance of units on the map.

Continued Production

Under the Standard and Advanced Game rules, when a city produces the same type of unit consecutively, every unit after the first one produced has its production time reduced by 1/6 (i.e., about a 17-percent time savings). When a city changes production to a different unit type, is captured, or (in the Advanced Game) is bombed, production must begin again from scratch and the next unit that city produces will require the longer (initial) produc-

tion time. This simulates the factories retooling when they switch production to a different unit type or to the repair of damage suffered (depending on the circumstances).

THE ADVANCED GAME ECONOMIC MODEL

> Regarding economics, the Advanced Game includes city efficiency variance, city specialization, and production delay due to unit support. These are only minor steps in the direction of more economic features. We didn't want to do any more than that.
>
> —Mark Baldwin

The Advanced Game has a slightly more intricate economic model, although it is still very straightforward. Basically, it operates on two levels—the individual city level and the *overall* level. Let's examine each separately.

Each individual city in the Advanced Game has a production efficiency rating that ranges from 1 percent to 250 percent. During a typical game, however, city production efficiencies are more likely to range between 60 percent and 160 percent. A city with a production efficiency of 100 percent takes the same amount of time to build a unit as it does in the Standard Game, including the time savings for continued production of the same unit type (see Table 10.1). A city with a 50-percent efficiency takes twice as long to build a unit, while one with a 200-percent efficiency takes only half as long. Cities lose their production efficiency points when they are captured or bombed, and regain them, slowly, on each turn that they are set to No Production (as discussed later).

A player's *overall* economy is an abstraction that represents the gross logistical needs of maintaining forces in combat. It is determined separately for each player and is based entirely on the number of units that player has on the map (including air bases) compared with the number of cities he owns. A certain ratio of cities-to-units must be maintained (with each city able to support approximately two units on the map) before the strain on one's logistics diminishes his overall production efficiency (as shown on a player's Status Report display). This reduction in production efficiency is *global* in nature. Thus, it effects all of that player's cities in addition to their individual production efficiencies. The exact formula is shown in Table 10.4.

UNIT PRODUCTION

The normal unit-production times are given in Table 10.1. For players of the Advanced Game (such as you), these values represent the time it takes a city with a production efficiency of 100 percent, operating in an overall economy that is also 100-percent efficient, to produce a unit. While circumstances will often vary, these values still serve as a basis for relative comparison of production times.

Production Equivalency

When making a decision whether to produce one unit-type over another at a given city, it can help to visualize the opportunity cost. Table 10.2 uses the most quickly produced unit (infantry) as the base line for production comparisons.

For those veteran players of *chess* or other strategy games, Table 10.2 might help you to think in terms of assigning each unit a point value. This would give an infantry unit the value of a single point, armor would be worth two points, and so on, up to a fully loaded aircraft carrier,

TABLE 10.1: UNIT-PRODUCTION TIMES

UNIT	INITIAL PRODUCTION	CONTINUED PRODUCTION
Infantry (Army)	6	5
Armor	12	10
Fighter (Aircraft)	12	10
Bomber	12	10
Destroyer	24	20
Submarine	24	20
Transport	30	25
Cruiser	36	30
Battleship	60	50
Aircraft Carrier	48	40

Notes:

1. A city's production time will be adversely modified by the player's production handicap.
2. In the Advanced Game, all cities do not produce at the same rate, so the production times are also modified by the city's efficiency.
3. In the Advanced Game, some cities will specialize in a given unit type. These cities will produce their specialized unit type 20% faster than normal and all other unit types 10% slower than normal.
4. In the Advanced Game, as a player gets more units on the map, his overall production efficiency might drop. This will affect every city that is producing units.

worth 24 points. If you can keep these point values in mind as you suffer and inflict losses, you can easily measure who is winning the larger *battles of attrition* occurring on the map.

Overall Production "Handicap" Ratings

Overall production-efficiency handicaps can be selected for each player individually from the production-handicap column of the Player Setup screen, as shown in Figure 10.1. If a production handicap is selected, all of that player's cities will require more time to produce units through-

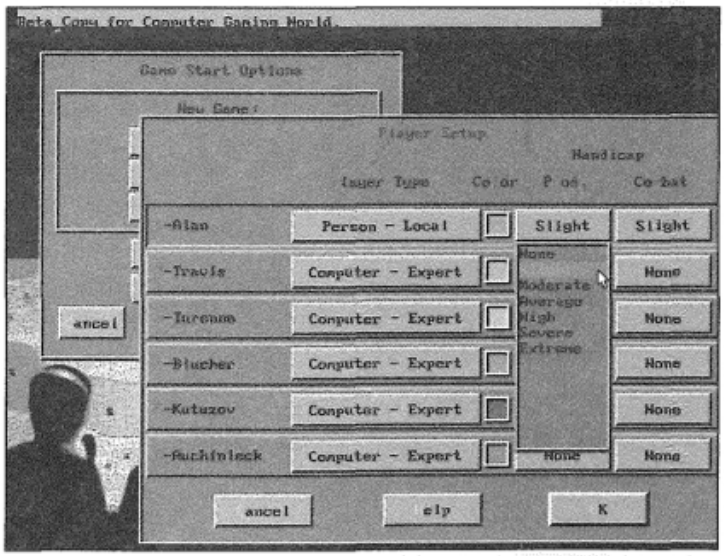


Figure 10.1 Choosing production handicaps from the Player Setup screen

TABLE 10.2: THE ECONOMIC-EQUIVALENCY CHART

1 infantry	= 1 infantry unit
1 air base	= 1 infantry unit or 1 armor unit
1 armor	= 2 infantry units
1 fighter	= 2 infantry units
1 bomber	= 2 infantry units
1 destroyer	= 4 infantry units
1 submarine	= 4 infantry units
1 transport	= 5 infantry units
1 cruiser	= 6 infantry units
1 aircraft carrier	= 8 infantry units
1 battleship	= 10 infantry units
1 transport (fully loaded)	= 11 infantry units
1 air base (with 8 airplanes)	= 17 infantry units
1 aircraft carrier (fully loaded)	= 24 infantry units

TABLE 10.3: PRODUCTION-HANDICAP PERCENTAGES

HANDICAP	OVERALL PRODUCTION-EFFICIENCY RATING PERCENTAGE
None	100.0%
Slight	90.9%
Moderate	80.0%
Average	66.7%
High	57.1%
Severe	44.4%
Extreme	33.3%

out the game. We will give examples of this following Table 10.5. The exact percentages for production handicaps are given in Table 10.3.

Overall Production: The Logistics Factor

In addition to the handicap you are currently working under (as shown in Table 10.3), there is one other potential reduction that might affect your overall economy. Having too many units on the map, in relation to the number of cities that you own (regardless of whatever their individual production efficiencies might be), will lower your overall economy and, thus, globally increase the amount of time it takes to produce units at each of your cities. This is an abstraction representing the gross logistical needs of supporting a large number of units in combat. The exact formula for determining the reduction to your overall economy caused by having too many units is given in Table 10.4.

Note that because of the squaring of the Drain Value in this formula, each additional unit

TABLE 10.4: EXCESS UNITS OVERALL ECONOMIC REDUCTION FORMULA

Units Alive

- (2 x Cities in No-Production mode) - 4 / (2 x Number of Cities Owned) + 2
  = **Drain Value**

If the Drain Value is greater than 1, then:

Base Production Time x (Drain Value squared) = Production Time

Otherwise:

Base Production Time = Production Time

(This is then modified by the player's production handicap.)

For example, if you had 100 units on the map and 29 cities (3 of which were in No-Production mode), the math would work out this way:

100 (Units Alive)
- 10 (2 x 3 cities in No Production mode) = -6 - 4 = -10 = 90
/ 60 (2 x 29 Cities Owned) = 58 + 2 = 60 = 1.5 (Drain Value)

Since this is greater than 1:

6 (Base Production Time for an infantry unit)
x 2.25 (Drain Value of 1.5, squared)
= 13.5 (Turns to produce that infantry unit, rounded up to 14)

over the safe Drain Value limit decreases your overall economy more dramatically than the previous unit. This geometric decrease can quickly suffocate your overall economic rating if your forces continue to build up. Fortunately, cities in No Production mode can greatly help offset having an abundance of units and help reduce your Drain Value (while they improve their own, individual production-efficiency rating).

Sadly, the computer keeps this logistical tax opaque to users. Only the results are shown on their status screens. There is no button to press that will display this formula with your specific numbers plugged into it.

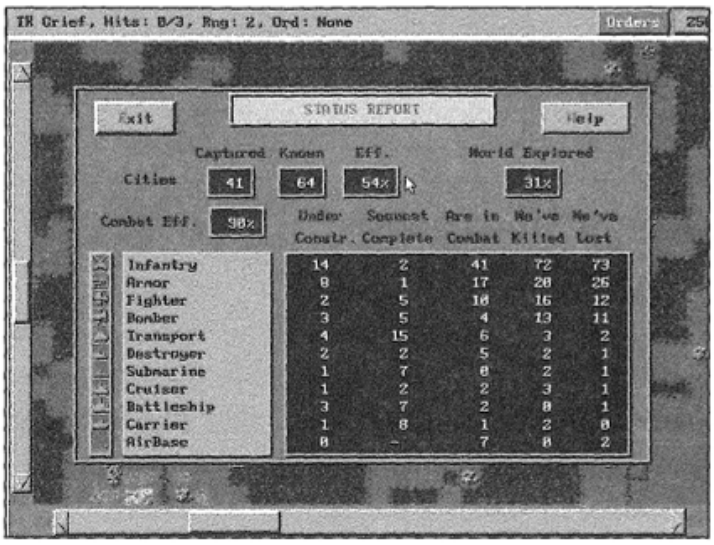


Figure 10.2 A Status Report with a low (54%) overall production efficiency

The City-Production Formula

The city-production formula considers the effects of a city's individual production efficiency, its production specialty (if any), and the state of that player's overall economy, and modifies the base production time to build a unit accordingly. This is presented in Table 10.5.

An example of how this formula works out mathematically can be garnered from Figures 10.2 and 10.3. Figure 10.2 shows that this player has an overall production efficiency of 54 percent (attributable entirely to having a High production-handicap setting). Figure 10.3 shows the city of Preston's production display: it has an

TABLE 10.5: CITY-PRODUCTION FORMULA

BT x IP x SM x PE x OE = AT

BT = Base Time to produce a given unit type (as per Table 10.1).

IP = This value is 1 if an initially produced unit, or 5/6 if continuing production.

SM = Specialty Modifier (if any). If the city has a production-specialty unit-type, this value is .8 (i.e., that unit will take 20% less time to produce) while for all others this value is 1.1 (i.e., it will take 10% more time to produce).

PE = Production Efficiency of that city.

OE = Overall Efficiency of that player's economy (a combination of the Drain Value and the production handicap).

AT = Actual Time in turns to produce that unit.

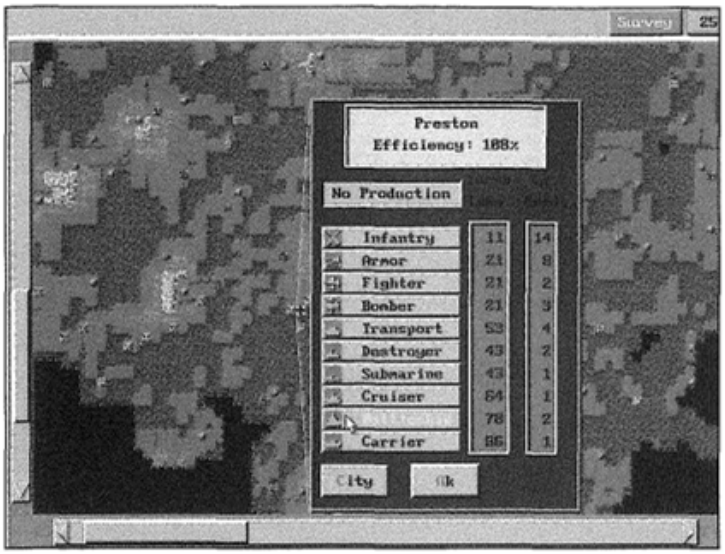


Figure 10.3 The Production menu shows the high cost of this low overall production efficiency.

individual production efficiency of 108 percent and specializes in battleships. By applying the City Production Formula from Table 10.3, you can mathematically work out why Figure 10.3 shows that it will take 11 turns to produce an infantry unit, 53 for a transport, 78 for a battleship, and 86 for an aircraft carrier.

HOW TO IMPROVE YOUR ECONOMY

> I believe that the game outcome is much more tied to production-efficiency differences than combat efficiencies. Strength in numbers has always been the key to victory in my experience.
>
> —Bob Rakosky

Ultimately, economic superiority should win the wars in *Empire Deluxe*. Overwhelming your opponent economically (by producing a flood of units) will, given competent play, lead you to eventual victory (as it did the North during the American Civil War and the Allied powers during World War II). Optimally, therefore, you want to have a large, efficient economy. What follows in this section is a list of ways to expand and fine tune your economy so that you can garner maximum production from it.

Capture Cities

Duh. What do you think we've been talking about throughout this whole book? The cut and thrust of *Empire Deluxe* is taking cities. Naturally, capturing cities is the best way to expand your own economy. At the beginning of the game, when capturing neutral cities, go for the ones with the larger production efficiency first to get your production off to the quickest start possible.

Protect the Cities You Have

Duh again. Defense of your empire was discussed in Chapters 4, 8, and 9, but keep a special eye out for enemy airplanes (particularly bombers). Since they can sneak up on your cities the fastest and hit them multiple times, airplanes can wreak havoc on a city's local economy. Keep fighters handy inside cities (i.e., not on patrol duty) that are within range of enemy air units (and hope that you win the battles for and around these economic engines). Also, garrison units inside the city itself will increase the chance that a stray enemy bomber will target them instead of your city's precious production- and production-efficiency rating.

Dealing with Low City-Production Efficiency

In the Advanced Game, each city has its own production-efficiency rating. During the ebb and flow of battle, cities will change hands and be attacked by *bomber* units. Each time this suc-

cessfully happens, their current production-efficiency rating is reduced by 10 percent of its current level (rounding all fractions up to the next whole number). Thus, a city with a 131-percent production efficiency that changes hands or gets bombed by bombers will have its production efficiency reduced by 14 points to 117 percent. If a city is hotly contested or is repeatedly hit by bombers (or worse—both), it can rapidly become of little immediate use as a manufacturing center.

The only way to improve the production efficiency of a city is to switch it to No Production, and wait. Generally, it will increase its production at the rate of one efficiency-percentage point per turn until it reaches 104 percent. When trying to reach 105 percent, and each percentage point after that, it takes a multiple number of turns off-line to increase a single percentage point of production efficiency, as listed in Table 10.6.

ANALYZING THE NO-PRODUCTION STRATEGY

The question players must ask is this: "When should cities be taken off-line to raise their production efficiency and at what point should they be switched back to producing new units?" The answer is nebulous and varies with the current situation on the map. However, we will present some guidelines to help you make that decision.

The Computer Player's Expedient

First, let's see what the computer players do with their low production-efficiency cities. When a computer player decides that it wants a given city to produce a certain unit type, it asks: "How many turns will it take me to produce that unit at the current production efficiency?" It then asks: "How many turns will it take if I wait one

Table 10.6: Production-Efficiency Increase Timetable

Current City Production-Efficiency Rating Level	Turns of No-Production Required to Increase This Rating by One Percentage Point
Less than 105%	1
105%–114%	2
115%–124%	3
125%–134%	4
135%–144%	5
145%–154%	6
155%–164%	7
165%–174%	8
175%–184%	9
185%–194%	10
195% or Greater	11

TABLE 10.7: COMPUTER-PLAYER MINIMUM-EFFICIENCY PERCENTAGES BEFORE A CITY SWITCHES FROM NO PRODUCTION TO BUILDING A GIVEN UNIT TYPE

UNIT TYPE(S)	SPECIALIZES IN THAT TYPE	NO SPECIALTY AT THAT CITY	SPECIALIZES IN ANOTHER TYPE
Infantry	19	20	25
Armor, Fighter, or Bomber	25	29	28*
Destroyer or Submarine	34	38	43
Transport	40	42	41*
Cruiser	42	46	47
Carrier	46	53	56
Battleship	52	59	62

* We know this looks wrong, but due to some weird rounding off while calculating the formula, this is actually the correct number. Trust us.

turn to raise the production efficiency before producing the unit?" It then does whichever produces the unit faster as a *high-priority task*. It may raise a city's production efficiency even higher than the answers to these questions allow and keep a city off-line longer, but computer players consider that to be a *low-priority task*.

Naturally, there are variables to this formula—if the computer player has a production handicap, for instance. Assuming that a computer player has an overall economy that is 100-percent efficient, Table 10.7 shows what the minimum production efficiency of a city must be before a computer player will produce a given unit type there. The three categories show the difference between that city specializing in that unit type (i.e., producing 20 percent faster), having no production specialty, and specializing in another unit type (i.e., producing 10 percent slower).

Taking the "Long Game" Approach

The weakness in the logic used by computer players is that it does not plan for *the long game*. It just wants to produce that single unit as rapidly as possible. When you consider how many turns over the course of the entire game a city will be producing units, raising its production efficiency even a little bit can help it to create significantly more total units over a long period of time. Of course, the first ones to roll off the assembly lines will be delayed while the city is off-line raising its production efficiency, but once the units start to arrive, more total units will be produced in the long term.

For example, at a city that has no production specialty and a 1-percent production efficiency rating, the computer will raise it to 20 percent and then start building infantry units there (if it decides that is what it needs). Thus, within a

101-turn time span, that city will produce three infantry units (including the time it takes to raise its production efficiency). In that same 101-turn time span, however, raising the city's efficiency to 50 percent would have produced five infantry units (including the time it takes to raise its production efficiency). At what point it becomes more efficient to produce each unit type at every city production-efficiency level is the subject of Appendix E.

Another of the computer player's long-game production strategy weaknesses, of course, is that it must keep taking cities off-line for a while to raise their production efficiency enough so that they can build units that require longer production times. Combine this with the fact that a computer player will seldom improve his city's economy to 60 percent or better as a high-priority task, and you can take advantage of the weakness in this short-range planning strategy. By improving your individual city's production efficiencies so that they produce more units in the future, you can gain a decisive advantage and win through sheer numbers by using a long-game production strategy.

Exceptions to the Long-Game Approach

Obviously, raising a city's production efficiency by taking it off-line can only be done when that city faces no likely peril or is otherwise well protected. Frontline cities needed to crank out infantry units just to defend themselves can hardly afford the luxury of switching to No Production for a while! Survival should be considered first, therefore, and improving the city's production efficiency second.

Besides safety, time is also a consideration. If it looks like your fate in the game will be decided fairly quickly (through victory or by complete elimination), go ahead and put all your factories to work. In other words, when there is no long game left in your future, don't bother planning for it.

Therefore, when safety and time permit, play the economic long game and raise the production efficiency of your cities. Don't bother to raise them much over 104 percent, however, because after that point it takes an ever increasing amount of time to achieve each additional percentage point of production efficiency, as show in Table 10.6. Once cities have reached a production efficiency of around 100 percent, it is usually time to put them back to work. Again, Appendix E answers many of the specific timing questions for when to shift from No Production back to Production.

HOW TO DEAL WITH LOW OVERALL PRODUCTION EFFICIENCY

Figure 10.2 earlier in this chapter shows the cursor pointing to that player's overall production-efficiency number. In this case, that number is 54 percent. The maximum your overall production efficiency can ever reach is 100 percent. (In the old *Empire* game and in the 3.1 version of *Empire Deluxe* discussed in Chapter 16, it can go higher, but not in the 3.0 version of *Empire Deluxe*.) When it falls below its maximum, there are four things you can do about it, as discussed next.

Stop Playing with a Production Handicap

As shown in Table 10.3, a production handicap lowers your overall production efficiency and, thus, is a gamelong drain on your economy. The reason that the player in Figure 10.2 only has a 54-percent overall production efficiency is because he is playing with a High handicap. To stop playing with a handicap, save the game and

reload it. Then, simply readjust that handicap on the Player Setup screen.

Capture More Cities

As shown in Table 10.4, owning more cities will keep the overall economic Drain Value of your units within their proper proportions. Everything hinges on the number of cities you own.

Put Cities You Already Own in No-Production Mode

Again, as shown in Table 10.4, cities that you take off-line and put in No Production mode greatly increase their effect on reducing your units' overall economic Drain Value. It also reduces the number of new units being produced (which is good, because they would only exacerbate the problem). Furthermore, it improves that city's economic efficiency so that, when it does go back into production mode, it will produce units faster and more efficiently.

Eliminate Friendly Units

There are two ways to eliminate friendly units. One is to disband them voluntarily. This can be done painlessly to old air bases that are no longer being used (since they cannot be converted back into infantry or armor units) or, perhaps, to garrisons so far to the rear that they are not worth bothering to move up to the front. (Computer players never attack a player's rear areas, although human adversaries might, as discussed in Chapters 8 and 15.) Note that disbanded units are not considered as losses in your Status Report screen's "We've Lost" column.

The other, preferable, way to lose units is by engaging the enemy in combat with them. (Everyone wants to "die with their boots on," right?) When you have so many units that they become a drain on your overall economy, take that as a signal to marshal them for an offensive against the enemy, and thin their numbers down (both yours and the enemy's) through combat attrition.

HOW TO RUIN THE ENEMY'S ECONOMY

It isn't always enough simply to improve your own economy. Ruining your opponent's economy is a time-honored tradition among aspiring conquerors. This section presents a few tools of that trade.

Take and Keep His Cities

That was pretty obvious, wasn't it? Usually the only thing better than capturing a neutral city to add to your economy is to take one of the enemy's. Not only does this add to your economy, but it also reduces his—a double benefit! About the only time you wouldn't want to capture an enemy's city is when you do not want to provoke his ire (see Chapter 13 on diplomacy).

Take His Cities That You Can't Keep

Even if you don't have the strength in an area to hold on to an enemy city, it is usually very beneficial to try to capture it anyway. By doing so, you may gain any or all of the following multiple advantages:

- He may lose additional units inside the city when you capture it. Thus, you get some free kills.
- It might cost the enemy a few extra casualties to retake it (depending on his luck).

- It gives you, and denies the enemy, an air base and repair facility in a contested area.
- You will stop its production of enemy units for a while.
- You might get an extra infantry-unit's worth of production from the city before the enemy retakes it.
- Losing it will temporarily reduce the enemy's overall economy.
- Owning it will temporarily increase your overall economy.
- Even a low-production-efficiency city, if switched to No Production, can greatly improve your overall economy.
- You will knock down its production efficiency by 10 percent twice (once when you capture it and again when the enemy takes it back), leaving the enemy with a reduced capacity to make war on you.

Therefore, take an enemy's city, even if you don't think you'll be able to hold on to it. The potential benefits are usually worth it. Be careful to minimize your risk; i.e., try not to expose much-needed transports on these raids or to get yourself caught in a situation like the one the German army did at Stalingrad during the second World War. Also, be aware of the diplomatic consequences of attacking another player's cities (see Chapter 13).

Bomb His Cities

You have two airplane types and, thus, two tools for bombing enemy cities. As you can see in Table 10.8, fighters do not have a good chance of succeeding in an attack against an enemy city, nor will they reduce its current production efficiency by 10 percent if they hit it.

What this means is that, generally, you want to attack the enemy's cities with your bombers in preference to your fighters. Both of these unit types take the same amount of production time, but bombers have a better chance of surviving their air raid and are more ruinous to the enemy's economy when they do so.

The Drawback to Ruining the Enemy's Economy

Of course, there is an important drawback to ruining the enemy's economy. If you're playing

TABLE 10.8: CITY-BOMBING COMPARISON CHART

	BOMBERS	FIGHTERS
Base chance of succeeding in a bombing attack:	50%	33.3%
Base chance of dying in a bombing attack:	50%	66.7%
If the target hit is a unit, is it destroyed with a single hit?	Yes	Yes
If the target hit is a city, is its current production stopped?	Yes	Yes
Does the city lose its continuous-production bonus?	Yes	Yes
Does the city lose 10% of its current efficiency?	Yes	No

to win (and you are), then one day the enemy's cities will be captured by you. When that happens, it will be your task to repair the damage you caused and put these captured cities back to work. This time, however, they will be producing new units for the good guys (i.e., *you*).

Therefore, only bomb enemy cities in areas where the situation is currently stalemated or you are losing. When you are advancing and will capture an enemy city, do not bomb it with bombers and further devastate its production efficiency. If you want to bomb such ripened cities, use your fighters to attack them instead. They can destroy enemy units there and reset the city's production but, like a neutron bomb, they will leave the factories intact and, thus, not reduce its production efficiency prior to your impending conquest of it.

ORGANIZING YOUR ECONOMY

The best way to keep your economy organized is known as the *5th Good Habit.* Taught to you at the end of Chapter 4's third tutorial lesson, it said that you should "always take a moment every 10–25 turns or so to step back and call up the Production Map." By reflecting on your overall building strategy you can either adapt it (or your battle plans) so that these two crucial elements work together in harmony. Try to think in the long term. Ask yourself where you will need land units, transports, etc. in 25, 50, or 100 turns (taking into consideration production and transfer time).

Do this by clicking around with the left mouse button on your various cities, both those with icons of the units they are building and those that are off-line in No Production mode (and, thus, have no icons over them). This click will put that city's basic information up on the Information bar, including its name, production efficiency, and the current unit type it is producing. For more detailed information, double-click the left mouse button and call up that city's production display. That also tells you the city's production specialty, how many turns until its current production is completed ,and how many of every unit type are currently being produced by you. It is also here where you can change that city's production.

Each City's Production Planning Priorities

Ask yourself these questions as you examine each city:

- Should this city be taken off-line to have its efficiency raised? Is it safe? Is it necessary for winning the long game or keeping your units' Drain Value in check?
- Is this city's production efficiency raised enough to put it back on-line and start producing units (as per Appendix E)? Is there a danger that this will adversely effect your overall economy modifier?
- Are you taking advantage of building this city's production specialty unit type? If not, should you raise its production efficiency a bit more to help offset the 10-percent penalty for producing any of the other unit types at that city?
- Are you building the correct balance of units to fulfill your strategic goals? Will you have the combined arms forces you need for optimal play?
- In particular, are you building enough transports?
- Is this city now *in the rear* so that its production should be changed? In other words, are you building the right units in the right places? (See the discussion below.)

Based on your answers, you will know what each city should be doing in terms of produc-

tion. That, in turn, will lead to your eventual triumph in *Empire Deluxe*.

The Renamed-City Reminder

For those of you who really like to be organized, try renaming your cities along theme lines. For instance, all the cities on one continent could have French or Italian city names, those on another continent could be named after coworkers or baseball stars, while another group could be named after local communities or simply numbered. Or rename a city with the turn number on which you wish to put it back into production. This can be particularly useful on large, wrapping maps where it is easy to lose your orientation.

Since the production specialty of a city does not appear on the Information bar, it might be a good idea to add its abbreviation to the end of the city's new name for ease of future reference. For example, if Waterloo specializes in producing armor, you might rename it "Los Angeles–AR." The point is to include a reference to any production specialty when renaming a city, regardless of the theme you choose to rename it by. If there are other human players in game, you might want to deliberately misrepresent the city's ability in its new name so that it will be a bit misleading when spied on.

NEWLY PRODUCED UNITS

After a while, your empire will expand to a point where some of your cities become far removed from the fighting. These cities, which are safely located to *the rear*, create special production and transportation problems. Obviously, units in the rear need to be moved up to *the front* where they are most needed. This section provides you with some useful suggestions for dealing with production in your rear areas.

Fast-Forwarding Production

The biggest trouble with building units in the rear is that they take ever increasing amounts of time to reach the front, particularly as you expand the front outward. Therefore, it is wise to build your fastest moving units in the rear since they can reach the front the quickest and, thus, get the most opportunity for employment during the game.

To illustrate this, imagine that your empire looks like a target (which is how your opponents see it, anyway). The bull's eye in the center represents your safest, rearward area (often against a map edge or in a corner). Each ring radiating out from there takes you closer to the frontline and the enemy, which is represented by the absolute outer ring.

In the bull's eye, you should build your fastest units—your fighters. The next ring is where your next fastest units, bombers, should be built. The next ring would, optimally, build destroyers; the next, your other ship types; and, finally, closest to the front would be your slowest pieces, land units. Of course, this sounds great in theory, but carrying it out in practice is always a tricky judgment call. This is especially true for cities with production specialties that are not well located in this regard. Do your best, keeping this bull's eye theory in mind as you ponder your rearward production.

This reprioritizing of rear-area city production will become an increasingly important consideration as the game develops. Its importance is, in fact, directly proportional to the city's distance to the frontlines of battle.

Automated Movement to the Front

While Chapter 6 explained all there is to know about automated movement, getting units produced in the rear closer to the front is the primary reason for issuing a command to set unit movement paths. By automatically forwarding units to cities (primarily ports) and air bases closer to the front, you won't have to bother giving all those tedious orders to every newly produced unit. Instead, you can wait until they reach their rendezvous point nearer the action, and command them from there. Be sure to take advantage of transports by using them as convoys to forward land units nearer to the action.

Coordinated Carrier Construction

When you order a city to produce an aircraft carrier, if you want it to set sail with a contingent of fighters on board, you probably will have to dedicate concurrent production at other cities expressly for that purpose. An average city will produce a half-load (i.e., four) fighters in the average time it takes to build an aircraft carrier. Placing two cities into concurrent fighter production will fill a newly launched carrier with a full contingent of eight fighters on board.

As these fighters are produced, you may want to set movement paths for them so that they automatically head for the carrier's construction city. As they arrive there, put them on sentry duty. When the carrier launches, it will automatically sail out with all the sentried fighters on board that it can carry. This will take these fighters out of the game for a while as they wait for their carrier to be built and reach the front, but assures that they will be there when the time comes.

ECONOMICS AND STRATEGIC PLANNING

The usual game of *Empire Deluxe* develops along similar lines. This section will help you coordinate your production to synchronize with the basic pattern of play during an average scenario of *Empire Deluxe* that features a random, hidden map. It also will consider other scenario types and production strategies for the early and middle games.

Initial Production Decisions

When playing on an unexplored map, here is how computer players consider their initial production decision:

- If a computer player starts the game seeing another city nearby (within two squares' distance under the Advanced Game rules), it will build infantry units right away until all immediately visible cities are conquered.
- If it sees no immediately available cities to conquer (i.e., the usual case), it will build a bomber 75 percent of the time and a fighter the remaining 25 percent of the time. That initially produced airplane immediately gets an Explore order.
- Infantry units will then be built and used to conquer the computer player's starting landmass.
- Once that is done, a transport is built.

Now, this is not bad logic. The programmers have given the computer players a sensible initial production strategy and one that human players would not suffer greatly from emulating. However, by making some slight modifications (i.e., adding the human touch), it can be improved on. (Note that artificial intelligence is the sole subject of Chapter 15. Our personal

strategies for initial production appear in Chapter 16.)

For instance, don't put your first airplane on Auto Explore duty right away. Use it manually for a few turns while you're waiting for your second unit to be built, and discover where your starting coastlines are. Those coastlines are sure to point you in the right direction. Once you've defined the geographic limits of your starting landmass, turn the airplane loose to explore automatically.

Unless there are a lot of cities apparent on your starting landmass, build a transport once you capture your first city. With one city producing a transport and the other armies, rapid expansion, both on your starting landmass and abroad, is possible. It is an excellent strategy to grab one city on every neighboring landmass as rapidly as possible and build armies there to conquer them before enemies appear. In other words, seed each neighboring landmass with a colony city and grow it to continental domination just as you did with your first city.

When playing on a visible map, early production decisions can be made more easily since you can see where you're going, with the exception of the *first* such decision. After selecting your initially produced unit, when asked if you are done with your first turn, select No. Now reexamine the map without your initial city's production display obscuring your view, and, if you like, go ahead and change your initial production decision. (After all, you're running a free country, aren't you?)

Early Exploration Production

Once your starting landmass is conquered, building a transport to get off it becomes a primary concern. An important secondary concern is to build units that will expand your ability to explore further. This will mean producing more

airplanes (and, occasionally, air bases in remote areas that will extend their operating radius) and destroyers (for deep exploration).

After you have a team of two or three cities working together, with one building transports and the other(s) cranking out armies, your remaining cities can concentrate on building a few more exploration units early on. Once you are satisfied that you have enough dedicated explorers running around, switch these cities to producing units more suited to your immediate combat needs.

Marking Your Target

Remember, when you have a choice of nearby cities to attack (particularly when they are all undefended neutrals), attack the best one first. Generally, this will mean the one with the highest production efficiency. One with an important production specialty (like infantry or transports) could be particularly useful early on, too. A port also might be more beneficial than an inland city as an initial conquest (just to get a transport under rapid construction). Again, look before you leap, and attack the choicest, easiest targets first.

INDIVIDUAL UNIT PRODUCTION AND ECONOMICS IN REVIEW

Here is a summary of each type of unit that cities can produce and some general descriptions of when and where they should be built. These commentaries are most applicable when playing

an average, unrevealed, randomly generated map scenario.

Infantry/Armies

This is your cheapest (six turns to produce) unit type and the one that you will probably build (and lose) the most over the course of a game of *Empire Deluxe*. Generally, frontline cities will produce infantry units for quick, additional reinforcements, and will continue to produce them until those cities are secure. Once secured, cities near the frontline can switch to more needed production, produce their specialty unit, or even go off-line and improve their production efficiencies a bit (i.e., gear up for the long game).

Remember that armies are better suited than tanks to operate in rugged terrain. They are also the only land unit-type that can enter mountain squares.

Because they are your cheapest units, armies should be converted into air bases in preference to tanks and, likewise, be first on the fodder list to reduce the chance of a good target being selected when a city is bombed. When your overall economy begins to slow down due to overproduction, armies located far from the front should be among the first pieces disbanded, because they are the easiest to replace.

Armor/Tanks

While tanks are among your low cost (12 turns to produce) units, like infantry, they are best to build on landmasses where there is (or is likely to be) some land fighting going on. Armor is particularly useful for moving and fighting over clear terrain and cities. The key to producing armor is to take advantage of specialty sites that produce them and to have one or two on board every transport (along with some infantry units) earmarked for an invasion. Thus, each transport would ideally be carrying a *combined-arms* set of land units on board.

Land Units in General

Land-unit production in rear areas should be limited to sites near ports that are building transports or other specially arranged pickup points. The reason for this is so that either you are building (in the rear, from scratch) fully loaded invasion barges (transports filled with troops) that will then be gathered together near the front for an invasion, or you create a convoy pipeline of continuously arriving land units being funneled up to the front.

After a while, though, it might take land units built in the rear so long to reach the front that they become a drag on your overall economy while en route. At that point, switch the production of these cities either to something that will take longer to produce (so that you'll have fewer total units over time) or to airplanes (which can reach the front faster and, thus, at least get into the fight before they become a drag on your overall economy).

Air Units in General

Early in the game, you will only need a few air units, primarily for discovering the map. Often, one air unit will do for quite a while. Once the enemy is engaged, however, you will want enough such units to set up a patrol screen along the front. You will also need airplane reserves for defending your repair ports from enemy air attacks and for their use in important air-to-sea and air-to-

ground attacks. Luckily, airplanes are low-cost (12 turns to produce) units, so building them doesn't take very long. However, since they tend to die off rather quickly, replacing your losses and expanding the number of them that you have in combat at any one time may require committing a lot of cities to their continual production during the middle stages of a game.

As the game goes on and more of your rearward cities become farther from the front, consider switching their production to airplanes. These units can reach the front soon after they are built via path move hops from base to base. Because of their speed, they are suited not only to production in the rear, but also as rapid reinforcements for a newly opened battle area. Airplanes will often play a decisive part in the early part of an invasion battle, for instance, where they can either secure the beaches (for the invader) or destroy the invaders before they can move inland (for the defender).

Additionally, when airplanes are in good supply, they can occasionally substitute for other unit types. Specifically, they can be used for escorting ships by flying a couple of squares ahead of the group. Also, airplanes can be used as a substitute for land units by conducting numerous air-to-ground attacks (although they tend to die very quickly in this capacity).

Transports

As we've said repeatedly, you simply cannot have enough transports. If you should ever find yourself pleasantly situated with a surplus of transports, you can always send them out as *Viking ships*. This means loading some up with troops and sending them off to discover unexplored areas. If they should happen on a city, attack it (assuming you can handle the diplomatic repercussions for doing so—see Chapter 13). Don't expect a lot to come of these nuisance raids. Usually, these Viking ship transports are eventually sighted by enemy patrols and destroyed. However, they can cause quite a bit of consternation to the enemy in the meantime while they raid deep behind enemy lines.

More likely, though, you will be hard pressed to replace your transport losses and expand their available numbers. As mentioned earlier, it is often a good idea to have a city building transports in tandem with one or two others producing land units. Thus, each time a new transport is launched, a ready-made invasion force will sail out of that port, complete with troops on board. After the invasion, the transport can be assigned to other duties, such as bringing up reinforcements.

Destroyers

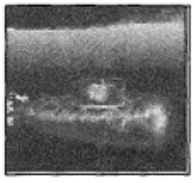
Destroyers are one of your two cheapest (24 turns to produce) naval units. They are of particular value early in the game when the only things out on the sea are likely to be transports and other destroyers.

As the game develops, however, they will be in less demand for critical map-discovery duty. Nevertheless, destroyers should still be produced in quantities sufficient for patrols and escort duty. You will need them, in particular, for antisubmarine warfare. As the game progresses, the need for destroyers will decrease while the demand for the more versatile cruiser units will increase. Shift your production accordingly.

If you have built a surplus of destroyers, use the extras to mop up any unexplored rearward areas or send them on deep-exploration duty where they should attempt to survey the locations and shapes of undiscovered landmasses and determine the location of as-yet unencoun-

tered players. While on these deep reconnaissance missions, your destroyers might also be able to go commerce-raiding against unescorted enemy transports. Count yourself lucky if you find any.

Submarines



Because submarines are one of your two cheapest naval units (at 24 turns to produce) and their life expectancy when attacked is so short (with their measly defense rating of one), a steady stream of them will be required if you deem their duties important enough to be performed. Of the three primary tasks that submarines are likely to be assigned to (patrolling your harbors to counter enemy invasions, patrolling choke points to monitor the enemy ships passing through them, and hunting enemy ships), two of them are defensive in nature and should not cause extraordinary losses.

However, when submarines are used aggressively to hunt down and destroy enemy shipping, particularly when operating behind an enemy's lines along his convoy routes, those submarines are likely to be on one-way trips. Just as only one German submariner in four survived at the end of World War II, eventually your losses in *hunter* submarines will also probably be as high (if not even higher).

Building submarines in quantities sufficient to replace their losses when used aggressively can be demanding. Building them in quantities such that their number on the map consistently grows can become a downright strain. As a production rule of thumb, a city with a 100-percent production efficiency dedicated solely to submarine production should be able to replace submarines at about the same rate that they are lost through aggressive use (1 in every 20 turns). If you want more submarines out hunting down enemy ships, you will have to commit more cities to building them, due to their high combat-attrition rate.

> Every submarine sent to hunt enemy ships should be considered, for all practical purposes, to be on a suicide mission. They are too fragile to count on returning a long way back to friendly waters.

Cruisers

In terms of ships, cruisers are your middleweight champions. They take a medium amount of time to produce (36 turns) and can do a bit of everything, including antisubmarine warfare, shore bombardment, surface combat, strong patrolling, and escort duty. They also make adequate explorers and can raid an enemy's rear areas, usually inflicting a lot of grief before they are eventually hunted down and destroyed. These Jack-of-all-Ships are the ones you should build when you can't decide what else to build at a given port. Since they are useful to some degree in almost every conceivable situation, they will be needed everywhere, all the time, and the demand for them will be great. Quite simply, you cannot build enough cruisers.

Battleships

Because this is the most expensive unit type to produce (at 60 turns), dedicating too much production to battleships will quickly constipate your economy. In about the same time it takes to produce a battleship, two cruisers can be created, and cruisers are far more flexible in their deployment abilities. Still, for surface combat and shore bombardment, battleships are the

reigning king, and you will want to have a few handy for your offensive operations and to lock horns with enemy battleships.

Whether the opportunity cost for producing a single battleship over 60 turns is worth it is debatable, at best. Therefore, consider only building them in ports that specialize in their production or in highly production-efficient port cities so that they will take less than 60 turns to produce. Only by lowering the time necessary to build a battleship do they become practical to build in large quantities.

Carriers

The demand you will have for these pricey (48 turns to produce) ships will likely be directly proportional to the vastness of the oceans between landmasses. If the distances are small, airplanes can just as easily be based on land, making aircraft carriers largely superfluous. Larger distances, however, may compel you to have some carriers so that you can project some air power over distant landmasses when you invade them.

Without an immediate need to project air power from a carrier, you will probably not need them. However, players may want to employ their aircraft on board as superpatrolling escorts or ultra scouts. Still, building aircraft carriers for either of these missions is an extravagant use of production that could probably have been better spent elsewhere. Of themselves, large numbers of aircraft carriers are rarely a good investment, particularly when considering that their construction price does not even include the fighters on board. Build them sparingly, perhaps only at ports that specialize in their construction.

A WELL-OILED MACHINE

Although the explanation of the economic system in the Advanced Game of *Empire Deluxe* presented in this chapter was detailed, its core elements are fairly simple. New players will quickly master the workings of their economy and will want to refer to this chapter's tables again for a deeper understanding of the math involved. Veteran players will see these numbers and be able to make more sense out of what is quietly happening on the game board as production continues, turn by turn.

Having read up to this point, you now have the keys for playing and winning any normal, solitaire game of *Empire Deluxe*. You will be adept at the Advanced Game rules, and should be able to persevere even against five expert-level computer opponents. Future chapters will teach you about the *real* challenge ahead—defeating other human opponents! We will help you to find them and connect your computers up for play. We also will more thoroughly examine the computer player's gaming skills and present several other odds and ends about *Empire Deluxe*.

Before all that, however, in order to reinforce the lessons of the previous chapters and to hone your skills to razor sharpness, the next chapter will take you through a replay of the third tutorial scenario. Only this time, we're going to analyze some of the details and really play it *right!*

Putting It All Together: Game Replay, with an Analysis of Player Options

This thorough re-examination of the third tutorial scenario is based on the important lessons presented in the previous chapters of this book. It also provides some insight into future chapters. By conducting a complete replay of the formidable third tutorial scenario found in Chapter 4, we will present problems and solutions as they develop.

To make this game more challenging (so that the eventual victory will be sweeter), we're going to play the other side—the side of Player 2, the green forces. After your experience in the tutorial as Player 1, you have already worked through many of solutions to the challenges faced by that side. This time, we thought we'd show you how the other half lives.

The third tutorial scenario is, admittedly, biased in Player 1's favor. However, armed with the skills and principles in this book, no mere computer player is going to prevent our triumph (although winning will not be easy). Following this, we are including a bonus replay of the opening moves from a typical game of *Empire Deluxe*. Forward!

PREPARATIONS FOR BATTLE

Setting up the scenario for this chapter, we selected BOOKTUT3.SCN. Ignoring the instructions to select Player 1, we're going to make it tough on ourselves and assume Player 2's position (as shown in Figure 11.1). Player 1 will be set to an expert player, and neither side will be suffering any handicaps. This is going to be a challenge!

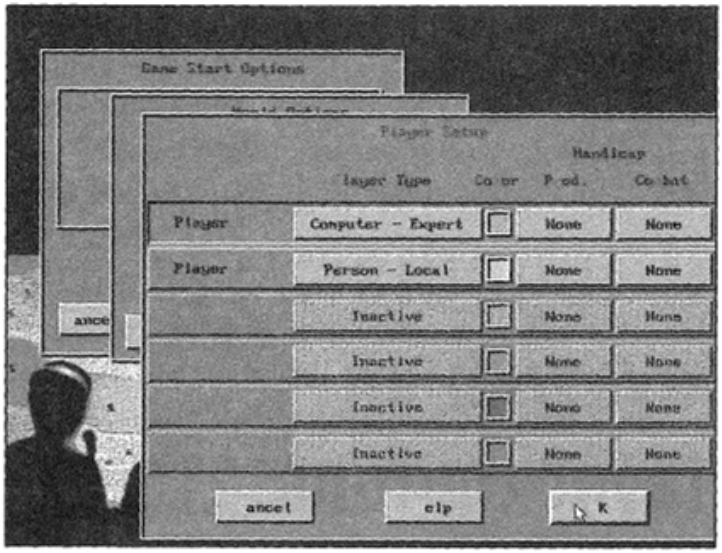


Figure 11.1 Taking the hard road

Our Initial Building Strategy

At the beginning of every game in which the map is undiscovered, select any unit type as your initial build. (Yes, *any* type!) When asked if your turn is completed, just say "No." This will clear the intrusive production-display window off the screen, revealing both squares in every direction of your starting city. We see that there are no other cities within our starting city's two-square discovery range and that we're beginning in a land-locked position. Fine.

After noting our initial city's starting placement circumstances, it is time to double-click the left mouse button on the city and open the Production menu again. Now we will change our production to what we actually need to produce first.

First Impressions

Examining the map around our starting location yields the following analysis: Judging by the slider bars along the west and south map edges, we're near the northeast corner. Since there is only one other enemy, presumably he will be somewhere to the southwest. For security reasons, however, exploration and conquest of the northern and eastern parts of the map must be made. Nevertheless, since the enemy is likely in the other direction, we will go that way first. Presumably safe corners can always be returned to later.

Therefore, we should go east and south first. That is where most of the map is, where most of the cities are, and where we are likely to first encounter the enemy. If we can capture good defensive positions before the enemy does, then we will have succeeded in our early game moves.

Tanks, but No Tanks

Frankly, there are valid reasons for initially building any of the four unit types available to us. Knowing in advance that this particular map features two dominant continents with several cities on each, cranking out land units right away is a perfectly valid option. Even armor, it could be argued, should be built right away. After all, we remember the continents to be fairly smooth so that the tanks can use their speed and reach the distant ports quicker than infantry. Armor also has a better chance to capture that all-important first neutral city. However, if it fails, it takes longer to replace (and, thus, leaves you defenseless that much longer).

Starting with a Grunt?

It might also be a good decision to start producing infantry units right away. The first one would roll off the assembly line very quickly (on turn 7). If we are fortunate and find another city very close by, it might capture that city before any of our other initial choices could even be built. However, because infantry do not make good exploration units, building an airplane fairly quickly is a must when cranking out infantry

units initially; especially if a coastline is quickly discovered, since infantry units are not able to probe overseas.

The question is, should you switch the production of your initial city to fighters or wait until some of you infantry units discover and capture a city? (That debate has raged for years, and we are not about to take sides on it.) While a matter of personal preference, many players will venture to switch their initial city over to fighter production if the first two or three infantry units haven't found another city. Similarly, they will switch to transport production if those infantry units reveal that no other cities are available on that island.

Flying Right

However, our approach to victory in this scenario will be through smart, conservative play. Although you can't send an infantry unit off exploring from our starting position without quickly discovering another city, rather than blindly scatter our troops shotgun style, we are going to "rifle our shots." Therefore, we will initially build an airplane. Its exploration will quickly help us decide which nearby cities are the best so that we can prioritize our early moves toward them.

Fighter or Bomber?

After choosing an airplane for our initial build, the debate switches to which specific type. We will choose a fighter for its speed. Our initial strategy is to scout the local area quickly (i.e., what fighters do best). We know from the start that the shorter range of a fighter will be a drawback after it reveals our initial continent (i.e., when we are exploring out into the ocean). However, that is the trade-off we're accepting for initial speed in exploration. (We must also remember to have some bombers in production to explore the ocean when the time comes.) This time, when asked if we are done with our turn, the answer is "Yes."

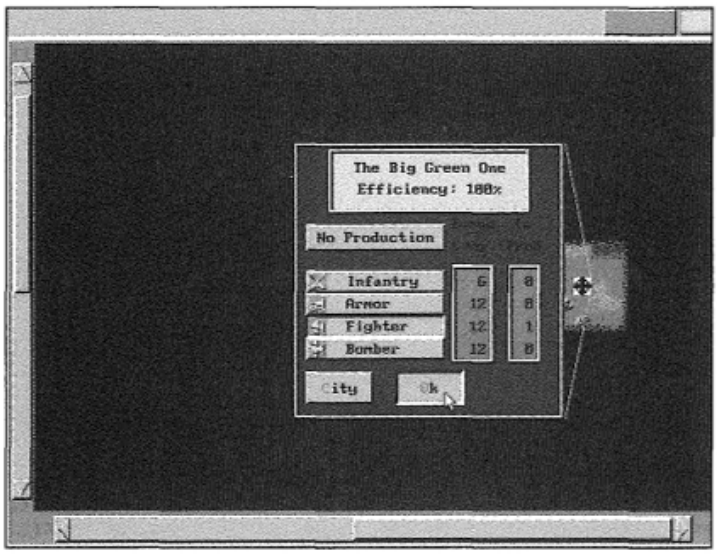


Figure 11.2 Our initial production for the BIG GREEN ONE

Switching Our Initial Production

On turn 13, with the fighter built, we switch production to land units with which to begin conquering our starting continent. Again, it is time to choose between two viable options, now either infantry or armor. Playing conservative, we order infantry production. We hope that, with a little luck in capturing our first few cities, we can multiply our armies quickly and, in effect, *ooze* over the continent like an ameba. Because of its longer production time, armor simply doesn't ooze as effectively in the early stages of the game.

OPENING MOVES

With vague memories that most of the ports of this continent were in the north, that is where we

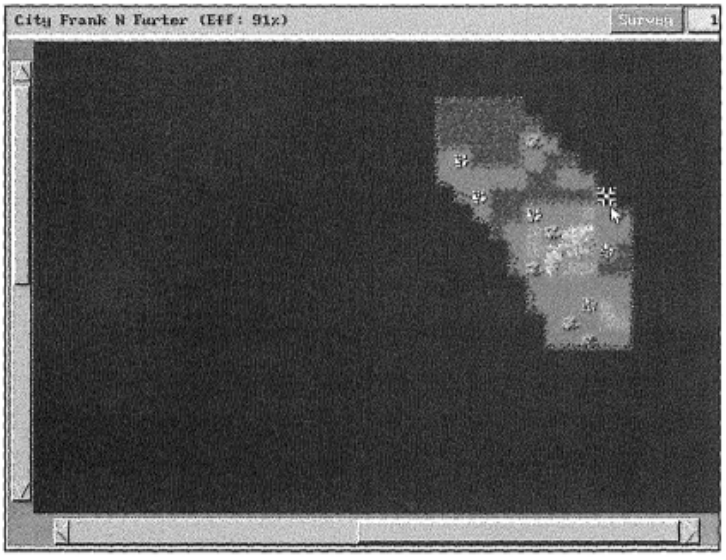


Figure 11.3 Early exploration around the city of FRANK N. FURTER

want to begin our exploration. Shunning the Auto Explore feature for the moment, we decide to manually explore the area to the north and west. After the fighter returns home from its first leg out and back, it discovers several cities, as shown in Figure 11.3.

By turn 19, our first infantry unit rolls off the assembly line, and so we pause to consider where to send it. By double-clicking the left mouse button on each of the eleven other cities discovered so far, we find that they're all about the same in terms of production efficiency (around 90 percent). Some, however, are ports and one, FRANK N. FURTER, specializes in bombers.

Now the questions to consider are as follows:

- Shall we grab the nearest port and start our long-term fleet building and see what is at sea?
- Shall we go for the specialty production in bombers right away and get this continent mapped out quickly?
- Shall we put this first infantry unit in Auto Explore mode and see where fate leads it?
- Shall we move against one of the two cities that are three squares away just to try to conquer one as quickly as possible?
- Shall we attack the closest city in the direction that has the most other cities to help speed the oozing process for conquering this continent?

While each of the first four options presents us with an opportunity to change our original, conservative plan of continental conquest, we will avoid them. The last option is the one best suited for oozing the most efficiently toward most of the known cities. Therefore, that is where we order our army to march. Figure 11.4 shows the way to the city of MAGENTA, our gateway to the many cities discovered to the northwest.

Our first attack on Magenta fails, but the second one succeeds. MAGENTA falls on turn 27. The Production Map appears (see Figure 11.5), and it's decision time again. However, we're sticking with our strategy of "grow and ooze," so we order more infantry units. Over the next

Figure 11.4 The urban-ooze approach begins on turn 19.

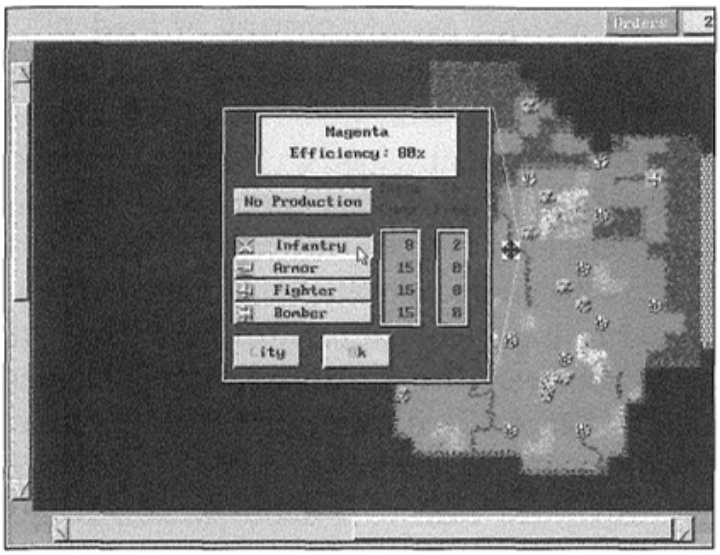


Figure 11.5 City of MAGENTA production menu

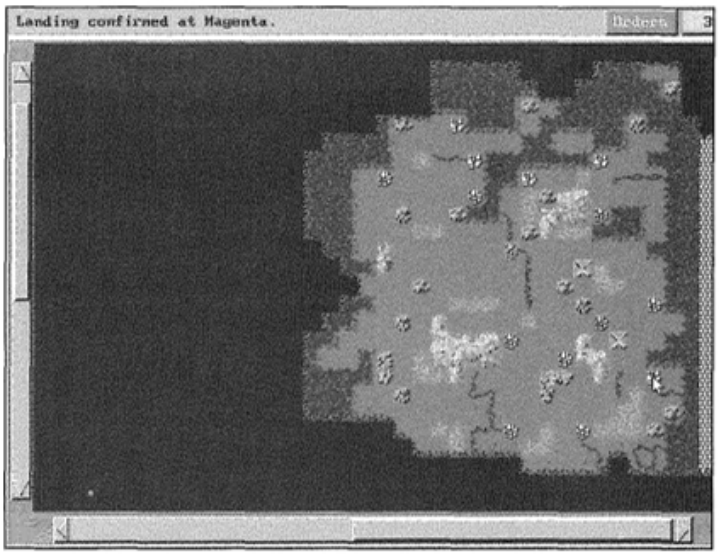


Figure 11.6 A two-prong attack: COLONS and BATTLE CREEK

several turns we can put our fighter on Auto Explore while our infantry units spread out across the fruited plain.

THE EARLY GAME: CONTINENTAL CONQUEST

The *early game* in this scenario is the conquest of the continent. The early game in every scenario is the stage of the game before regular encounters with the enemy. This is where expansion is done primarily at the expense of newly discovered neutral cities. Note that this can stage of the game can vary in length, and, if rapid contact is made with on all fronts with enemies and map edges, it can be a very short period indeed. Once the front lines are established and turns become regular jousting matches with the enemy, this is when the game shifts into its middle phase.

Production-Specialty Priorities

On turn 38, a new infantry unit appeared in Santiago, our southernmost conquest at this time. Although the city of MUDDY WATERS was a bit closer, we decided to move against BATTLE CREEK, which specialized in army production. Since we're in a time of early expansion, some extra hasty army production would be very welcome at this juncture.

The next infantry unit built in our starting city headed back to capture the port of COLONS concurrently with the drive on BATTLE CREEK (as seen in Figure 11.6). It is the city of FRANK N. FURTER, however, that will be where the first infantry unit to roll out of NOT QUITE will go to capture because of its bomber production specialty.

Observing our growth pattern for rapid conquest, each newly conquered city becomes its own hub of expansion. From these hubs, armies radiate out like spokes to nearby cities. This hub-and-spokes approach is more than the Amway marketing plan; it is also our way of saying that we are oozing across the landscape.

Making Progress

Things are going swimmingly by turn 47. As seen in Figure 11.7, BATTLE CREEK and FRANK

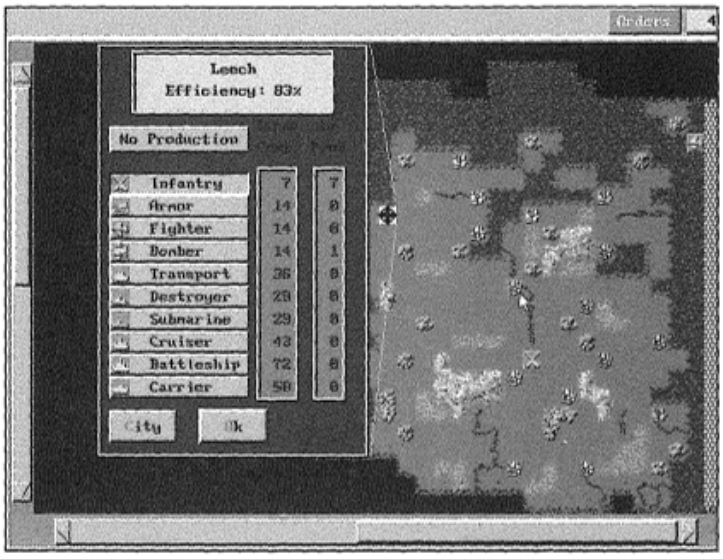


Figure 11.7 LEECH builds an infantry unit, starting on turn 47.

N. FURTER have both fallen, and each is busy cranking out its respective production specialty. Also, notice that the army built at MAGENTA has taken a long march to the northwesternmost city of LEECH. This port seemed like a better proposition than the three ports to the east of it because of its higher production efficiency. Fortune favored us, and it fell with our first attack. Presently, we're producing seven armies (including one at LEECH) and a bomber—not bad!

Reflecting on Production

Keeping up this production rate of land units after they are no longer needed for conquering our starting island will quickly become a problem. It those armies cannot be immediately transported off the continent to find other conquests, they will create a huge drag on our overall economy while they are hanging around waiting for a lift. Therefore, we must consider when it is time to cease producing hordes of cheap infantry units and avoid this economic drain.

Not only is the cease-army-production timing important, but what to change these cities' production to is another concern. If land units will still be needed in the short term, switching to slower producing tanks would be wise. If time is on your side (i.e., there are no enemies breathing down your neck), this would be a good time to start some long-term ship building. If these cities are low in production efficiency, this moment would be a good opportunity to raise them. At some point early on, however, fledgling empires need to take stock of their production and determine an early-game production strategy based on geography and whether or not to take advantage of any city production specialties.

The Front and Rear Areas

Before long, infantry units start to appear in the rear areas. It is important to understand the concept of the *rear area* and the *frontlines*. Rear areas are those that are furthest away from the fighting. These are generally protected by a combination of map edges and friendly forces between them and any enemy forces. Being thus secured, cities in your rear areas are ideal for building more time-consuming units (like ships), since their capture is less likely before their production is complete. It is also generally safer to return damaged units to the rear for repairs since they are thus less likely to be subject to immediate enemy attack (particularly if your rear is beyond the range of enemy air power).

The front is wherever your forces are engaging or closest to engaging in combat. Where units are fighting each other and cities are changing hands, that is the *front*. Naturally, production and repairs are much more problematic near the front since the enemy is so close and might attack at any moment. Generally, cities near the front will build armies since these are the quickest unit type to produce and will help secure the area. Seldom will a city right on the frontlines be producing ships, since the chances

of capture or bombing before the ship is completed are very high.

As the frontlines move away from a city that has been building infantry units to support the fighting, these cities find themselves with a bit of breathing space. It eventually becomes apparent that the infantry units they had been producing are not reaching the fighting quickly enough. At that point, some players will switch their production to either armor or some type of airplane. Building all three of these unit types (infantry, armor, and airplanes) takes little time, and they can move rapidly to support the fighting. This criterion of speed, both in production and movement, are demanded by the urgency of these cities being near, but not on, the frontlines.

Alternately, since many of these frontline cities become damaged during the ebb and flow of battle, as they become more secure their owners might consider switching them to No Production mode. This will immediately help improve the owner's overall economy (see Chapter 10). It will also, over time, improve the city's production efficiency for future production. Players who believe in the economic *long game* often take embattled cities off-line when they are able.

Thinking About the Long Game

Since there are already enough units nearer to the front producing infantry units, it's time to think about the long-game production strategy, as taught in Chapter 10. This means switching cities to No Production mode in order to optimize them to around a 100-percent production-efficiency level. Raising their production efficiency allows them to produce the greatest number of units over the course of the entire game. Putting them back on-line when their production efficiency is around 100 percent affords the least amount of delay before they can start

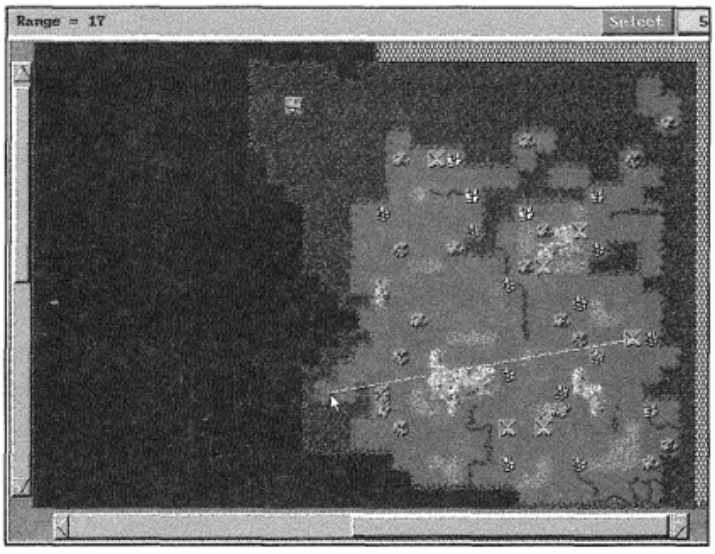


Figure 11.8 Surplus armies marching off for coastal defense

up production again with the most efficiency. Chapter 10 explained all of this.

As Figure 11.8 shows, our first city for optimization was the port of COLONS along the eastern seaboard. Although it had a fairly high production efficiency already (currently at 88 percent), improving it to the neighborhood of 100 percent would give us more units over the 300–400 turns this scenario should take us to win. When it reaches the 100-percent level, we will begin our fleet construction right here at COLONS.

Notice that Figure 11.8 also shows that the army built at COLONS is marching westward to square 48,19 to set up an air base. Since the western coast of this island has few cities, we must set up air bases and aircraft out here to further our exploration westward and to watch for the enemy.

Overcoming Setbacks

Over the next few turns, our luck begins to average out. Suddenly, our armies are dying left and right as they try to capture neutral cities. On turn 63, MOOR DOORS finally falls, but only after

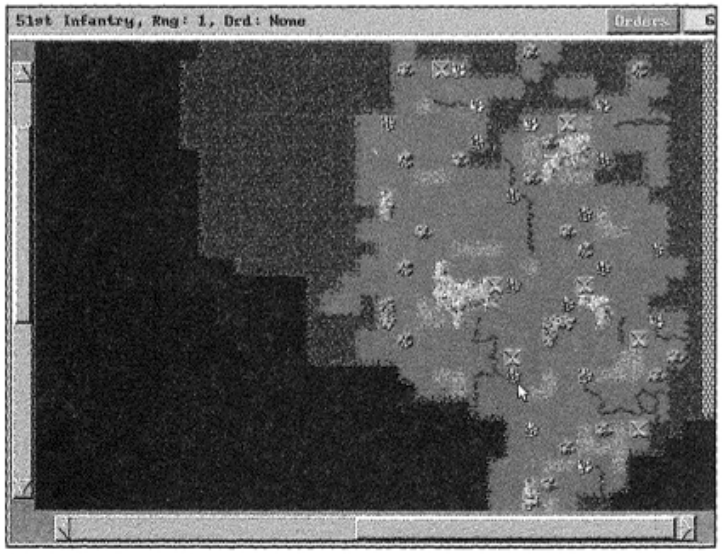


Figure 11.9 Putting the knock on MOOR DOORS and COLUMBIA

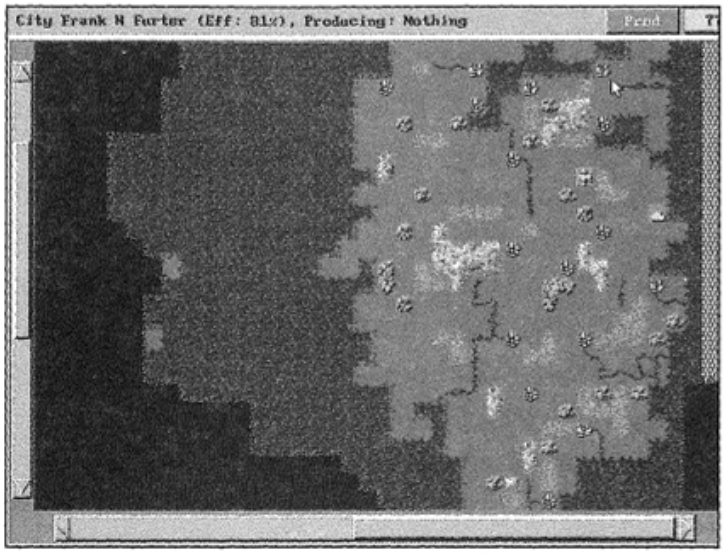


Figure 11.10 By turn 77, the mainland is secured

eight other armies failed to take it. The port of COLUMBIA, to the north, however, remains defiant despite many knocks at its door. At times like this, all you can do is wish the same bad luck on the other player(s) or try to improve the odds of your individual attacks by making them with armor units.

Digging in and Gearing Up

The deluge of infantry units finally does the job. By turn 77, we have captured every city on the continent, as shown in Figure 11.10. Now it is time to reorganize and prepare for the long, protracted campaign ahead.

We begin by switching almost every city to No Production mode right away. This is according to our long-game production strategy. Although it is quite radical to shut down virtually all of the factories at once, we can do so in this instance since we know that the enemy is a good distance away. Generally, it is more prudent to keep only a few cities off-line at a time, so that most of your cities are producing a steady stream of reinforcements for the short term while a few are raising their production efficiency for the long term in a well-protected environment

As each reaches approximately 100-percent production efficiency, it converts to producing appropriate units for the battles ahead. Only our starting city and COLONS are currently either at or over 100-percent efficiency. Colons has begun building transports, and The BIG GREEN ONE has taken over bomber production from FRANK N. FURTER while that city raises its production efficiency.

This is a nervous time when we are leaving ourselves deliberately vulnerable. At times like this, it is wise to spend some time preparing your defenses.

Since there are about a dozen surplus infantry units available and no more cities left to conquer by an overland route (and no transports to load up in), we must put these soldiers to good use. Some of these armies convert into air bases along the western and southern coasts while the others patrol the area immediately behind them. These patrolling infantry units will be the first to greet an enemy invasion and can serve to quickly replace any air bases lost to enemy shore bombardment. As Figure 11.11

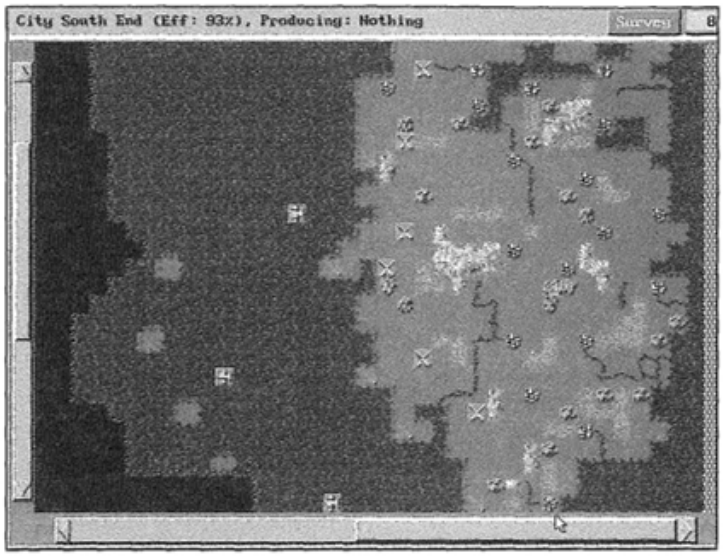


Figure 11.11 The defenses are in place.

shows, these defensive preparations are in place by turn 87.

The Enemy Approaches

Not long after turn 100, enemy destroyers are spotted exploring the ocean and, in particular, our coastline. This is shown in Figure 11.12. One of our bombers stumbles onto a submarine and sinks it while our first transport (built at COLONS) heads for our southern port of SOUTH END. We have stockpiled a boatload of infantry units there to make a quick dash down to the neutral city of MOBILE BAY. This will be a particularly useful port to own, because it specializes in cruisers—the navy's Jack-of-all-Trades ship type.

Organizing the Economy for Defense

As each factory reaches the near 100-percent threshold, it will come time to switch its production over to something useful. Many factors must be taken into consideration here, including city production specialties, the need for balanced forces (i.e., proper combined-arms formations), and not overproducing too quickly (and, thus, lowering the overall economy's production efficiency).

Based on these considerations, we quickly see that with only nine ports on the main continent (compared with as many inland cities), ship building will be crucial at nearly every one of them. While we wait for the building of our navy's main strength, we prepare in relative peace for every possible contingency. Figure 11.13 shows our production map at the end of this early-game, stage of play.

Since it will be a while before we can trans-

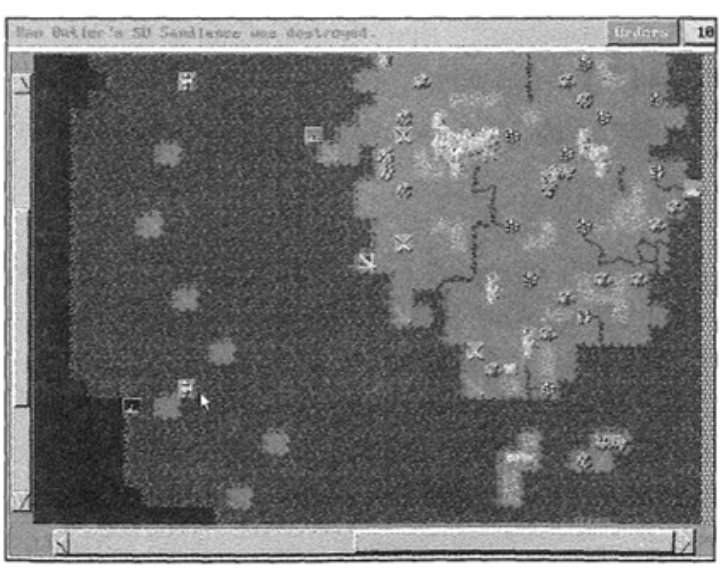


Figure 11.12 Early skirmishes

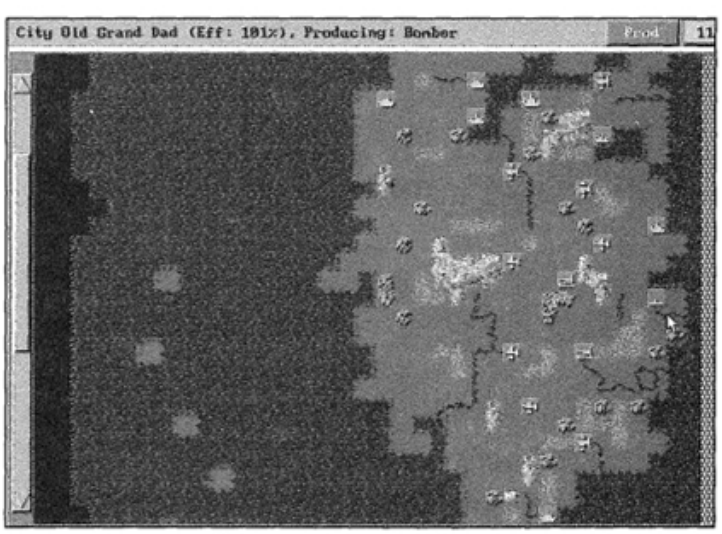


Figure 11.13 The Production Map of our economy in full swing

port land units off the continent en masse, it makes sense to produce fewer of these (and those produced should be armor because taking longer to produce, it, delays the strain on our overall economy). Airplanes, however, we can find uses for very quickly (patrolling the coasts and jousting with any enemy ships or planes that might approach). Notice that the two cities that specialize in infantry production in the south are producing submarines and bombers, respectively.

The Economic Plan of Action

With all of these factors in mind, we formulate a plan that meets our immediate needs and helps further some long-range fleet-construction goals. Ultimately, our building strategy is shown, numerically, a little further on in the Under Construction of Figure 11.14. Notice the numerous airplanes and ships under construction at this time.

If the enemy attacked en masse on the next turn, we would have plenty of planes to quickly greet his beachhead. Additionally, there are coastal infantry units on patrol plus reserves in the port cities of LEECH and SOUTH END. These

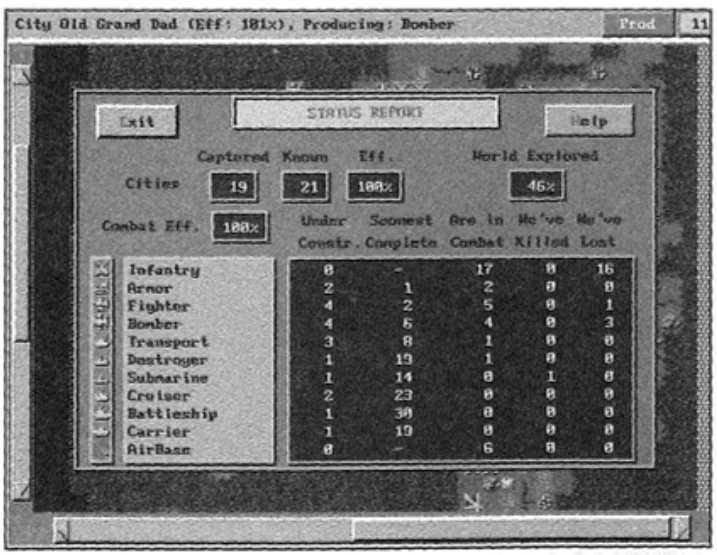


Figure 11.14 Our Status Report circa turn 112

latter reserves are slowly building up, awaiting the transports that will carry them from our continent. While they are still here, however, they are serving as useful counter-invasion reserve forces. Presently, we're ready to react, even as we prepare to take the initiative in the future.

THE MIDDLE GAME: LOCKING HORNS WITH THE ENEMY

While there are still some early game details to attend to, such as capturing MOBILE BAY and exploring the area around it, we begin preparing to engage the enemy at sea over the next 50 turns. Our initial objective will be to build air bases on the dipper islands and begin to project to that central region the massive air power we have built up.

The goal is to engage and destroy the enemy fleet with whatever tools we have available until our navy arrives in numbers sufficient to safely get our transports into the enemy's territory and back. The key is to not get rambunctious and attack prematurely. The enemy should be able to easily beat back a small landing and sink a lone transport or destroyer with just his airplanes. No, we need to mass up for a good-size assault. Once we're fighting land battles on the enemy's side of the board, that should denote the beginning of the *end game*.

The Dipper-Islands Dash

We are off to an auspicious beginning. Our constant air patrols over the dipper islands turn up little enemy naval activity and easily sink the lone enemy transport we've discovered thereabouts. We decide to make a dash for the islands with two transports, each carrying three infantry units. One will approach from SOUTH END, the other from LEECH, as shown in Figure 11.15.

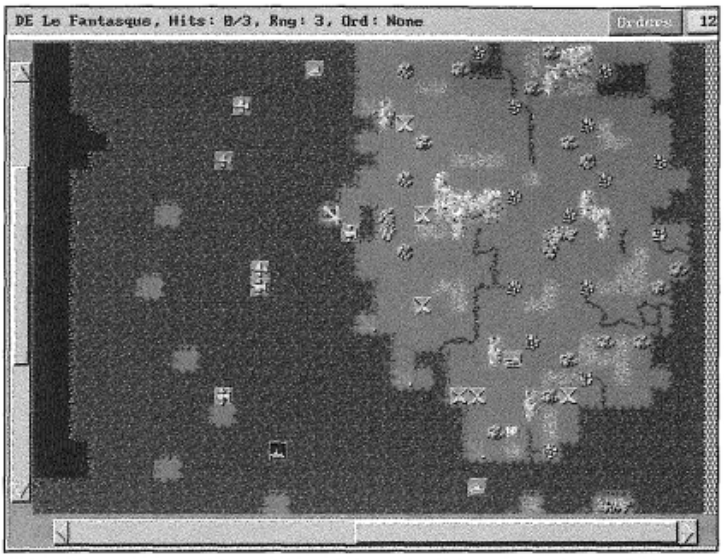


Figure 11.15 Moving out the transports

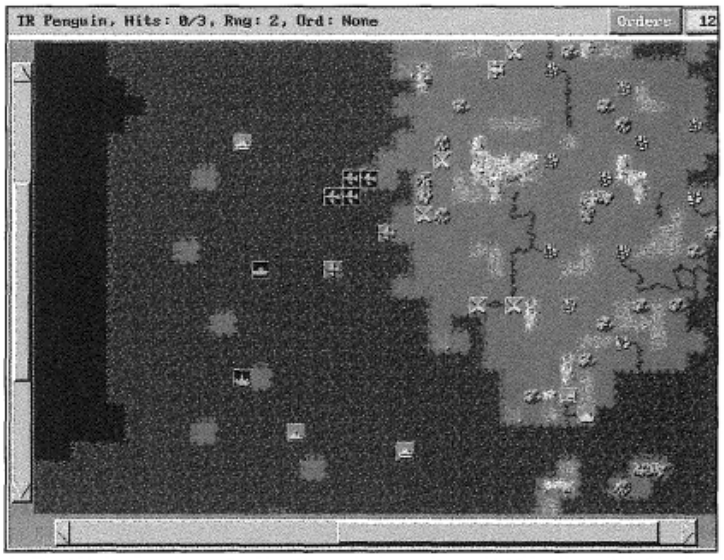


Figure 11.16 The enemy's carrier strike

Air Raid! This Is No Drill!

Trouble was not long to find us, however. A swarm of enemy fighters appeared, clearing away many of our patrolling aircraft. Computer-player fighters tend to go for friendly bombers, and so ours were quickly cut to pieces over the ocean. Our own fighters didn't fare much better and, without air superiority, we could not launch our remaining bombers against the suspected, and soon discovered, nearby enemy carrier. Darn!

The enemy carrier moved toward our coastline, successfully destroying more of our planes and coastal air bases with its relentless, lucky fighter attacks. Some early damage is shown in Figure 11.16. At present, our war ships consist of a single destroyer and a newly launched submarine that would take several turns to reach the main ocean.

Things are looking bleak as our two transports approach the dipper islands. To compound matters, an enemy cruiser was recently spotted patrolling that neighborhood. We anticipated that this stage of the game would look bad, and accepted this as the price for gearing up all our cities, but what else can go wrong?

The Slings and Arrows

By turn 140, we've seen the launching of several of our ships, including our first carrier (complete with four fighters on board). Assigning three of those fighters patrol missions to fly off the carrier itself, the fourth becomes our bookmark-waiting-technique unit. One (thankfully empty) transport was sunk by an enemy submarine, but a fighter quickly sank the submarine on the next turn. Presently, we're playing a bit of naval tit for tat in terms of losses at sea.

While our fleet is spending these turns launching and assembling into task forces, the enemy cruiser is reinforced by a battleship and the pair gleefully shore-bombard our coastal air bases as fast as we can rebuild them (a calculated risk on our part—putting air bases on the coast makes them vulnerable to enemy bombardment, but also allows them to project their sighting ability further out to sea). Every new bomber is going against these heavy enemy ships, but they simply refuse to sink.

Meanwhile, our two transports each managed to off-load their three infantry units on the dipper islands and sneak away. What a piece of good fortune that is! A few air units have been

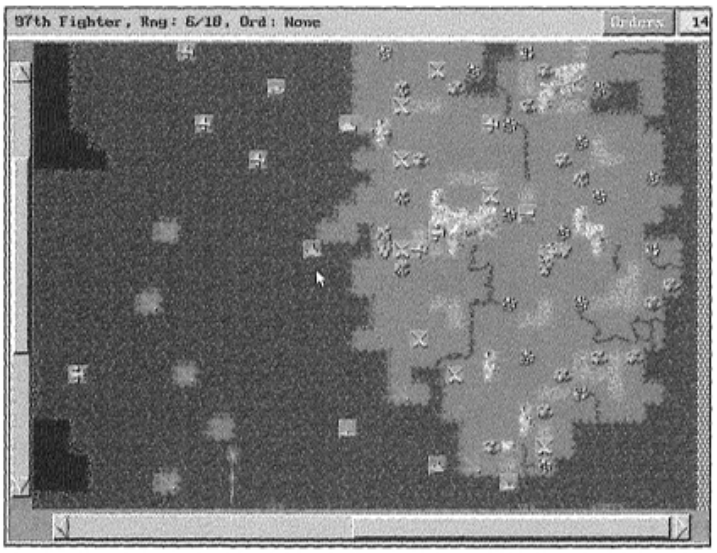


Figure 11.17 Dealing with the enemy threat

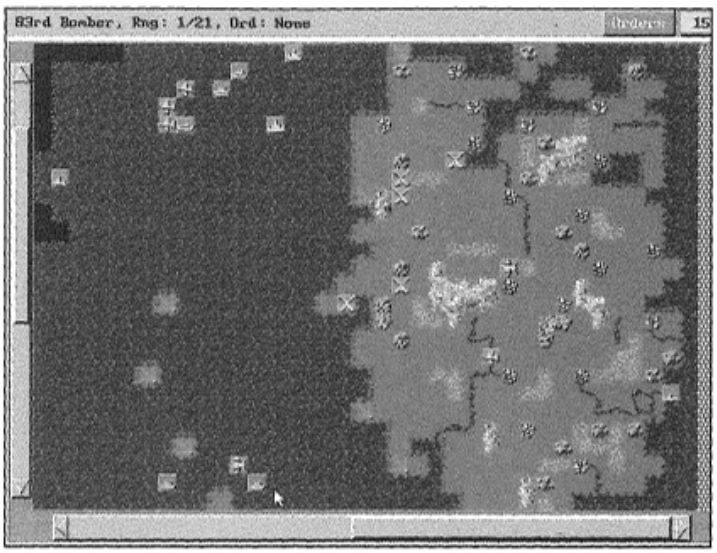


Figure 11.18 The enemy approaches as our initial invasion is launched.

based there and have been set to automatically explore. With luck, they will provide some early warning about additional enemy naval units appearing (particularly transports) as well as push back the blackened borders to the west, as shown in Figure 11.17.

Things have been very quiet in the north, so we may try a northern raid first just to stir things up. With our carrier escorting the transports, it just might be safe. Moving along the map edges instead of the center has its advantages. Computer players tend primarily to concentrate their strength in the center of their lines, as opposed to their flanks (which are often anchored by map edges). Additionally, maneuvering along a map edge means that there are fewer directions from which the enemy can intercept you. This makes it easier to prepare proper defenses facing directions that they *can* come from. We'll have to seriously consider this maneuver along the northern map edge. . . .

Early Warning

Ten turns later, our air bases on the dipper islands spot two enemy transports moving through the islands. As Figure 11.18 shows, our lone bomber is all we have to use against them. We have no ships presently in our southern waters, save a loaded transport sent to reinforce the dipper islands and, possibly, raid the enemy coast. We're currently at a point where our overall economy is suffering from having too many units. Thus, our imaginary *production clock* is telling us that it is time to capture a few of the enemy's cities and bring the war home to him.

In the north, we're assembling our first assault force: two fully loaded transports backed by a carrier with six fighters, a battleship, a cruiser, and a destroyer (as also shown in Figure 11.18)—not a large enough force to win the war, perhaps, but possibly enough to take and hold the islands in the north. This should distract the computer player's attention before it gets too set on invading our shores.

To Battle!

As our first wave of troops prepares to land in the north, the center of the board has seen some sparing (as shown in Figure 11.19). Enemy bombers have been flying over the dipper

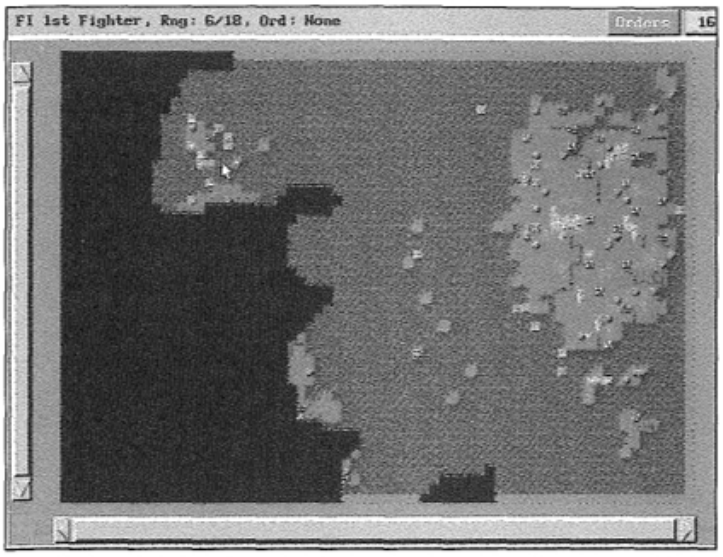


Figure 11.19 Hitting the enemy's northern island

islands and have destroyed some air bases there. Every airplane that we have redeployed there attacks the occasional enemy transport that tries to pass through eastward. So far, the enemy hasn't launched any kind of large scale, coordinated attack (like ours in the north). Casting our eyes skyward, we give appropriate thanks.

Losses at sea have been favorable for us. As Figure 11.20 illustrates, the enemy has lost more transports, destroyers, and other ships than we have (including a battleship, but their cruiser did manage to limp away with severe damage). However, we're paying the price for this success in high bomber losses. Fortunately, we're building our forces in the right numbers to create a good combined-arms mix. Being particular fans of cruisers, notice that we're building plenty of them.

Notice that our overall production efficiency has dropped to 43 percent. We desperately need to conquer an enemy city. Figure 11.21 shows that city to be the one called YONDER, on the northern island. With a high efficiency, it could crank out battleships for the enemy very fast. Since we've dropped into the neighborhood with our invasion mini-armada, however, the enemy has taken notice and switched to infantry production. Still, it will be a feather in our cap (and a slight relief to our economy) to capture YONDER. With two fully loaded transports ready to knock at the door, the odds look favorable.

Concurrently, two fully loaded transports from SOUTH END are moving northward along our coastline to reinforce our attack on what seems the lightly guarded enemy north. Another fully loaded transport sails out of LEECH to meet them in northern waters. With these three loaded transports as reinforcements, we can hit the ene-

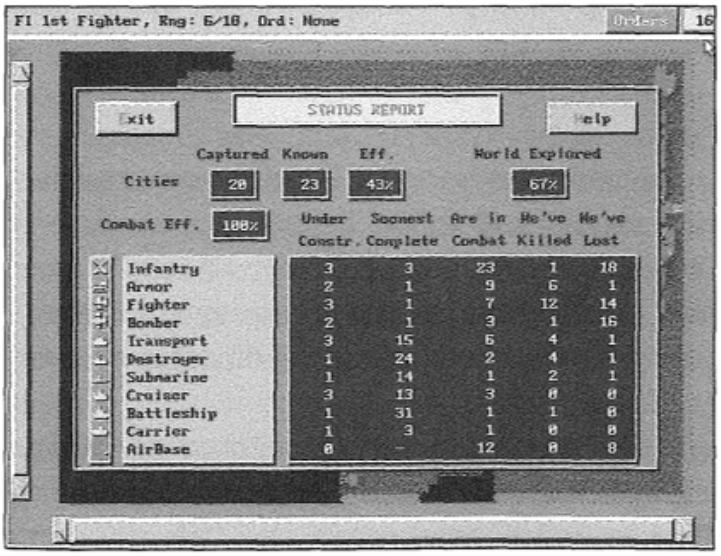


Figure 11.20 Our Status screen on turn 165

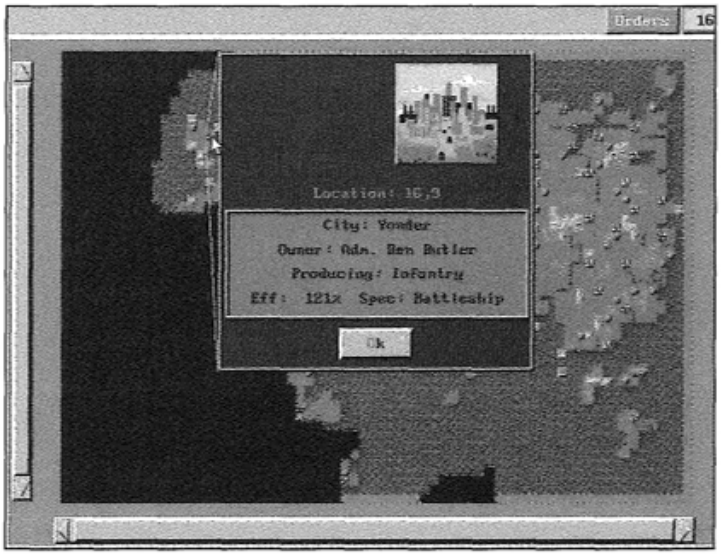


Figure 11.21 The information window for YONDER

my's mainland and could fight him to a stalemate over a limited bit of ground there. If we can do that, then winning could just be a matter of setting up convoys of reinforcing troops and keeping the sea lanes clear.

THE BEGINNING OF THE END

With the northern islands secure, we repair the damage to our ships from enemy air-to-sea attacks and assemble them for the first landing on the hostile mainland's northern coast. As expected, our activity to the north is drawing units toward it like a magnet. Undaunted, however, we invade—first from the northern islands, then with our reinforcing transports from the east.

As seen in Figure 11.22, we initially land near the city of CUNAXA. Our fighters busily destroy enemy bombers one by one, while the troops knock at the city's gates. Luck is with us, and it falls on the first try. However, a rogue enemy tank soon comes along and briefly recaptures it for a turn during this early landing period. Fortunately, Cunaxa was empty when the enemy briefly retook it.

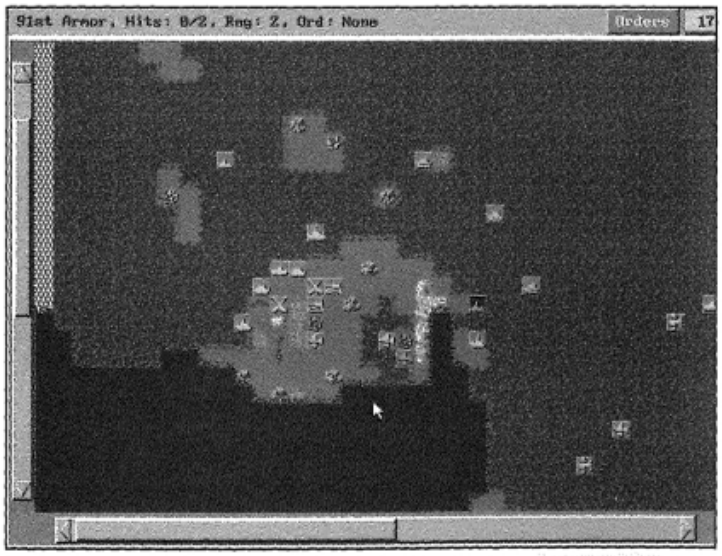


Figure 11.22 Taking the war home to the enemy

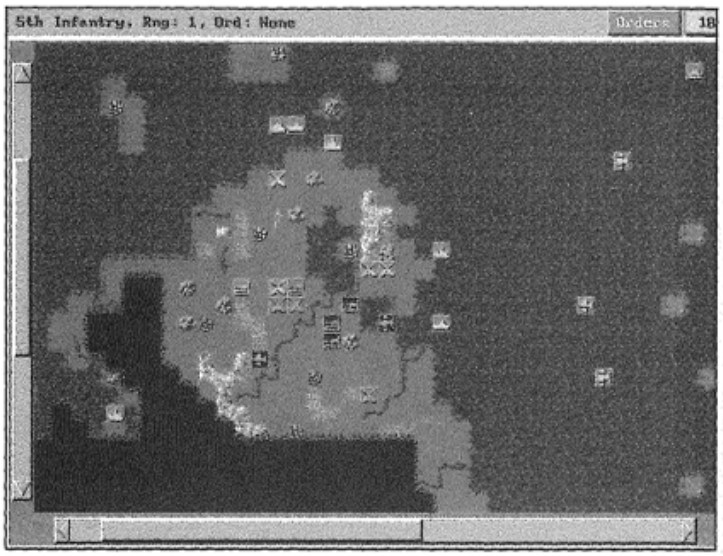


Figure 11.23 The second wave of invasion forces lands.

By turn 186, two of our three transports from the east have arrived on the enemy's shoreline. The infantry units head over the mountains to JARVIK while the tanks roll around to the north and south (as shown in Figure 11.23). Sadly, an enemy submarine sank a transport with which we had planned to hit the beaches. Even a tight air screen cannot always stop submarines, so we chalk up that loss to the fortunes of war. Thanks to our preparation, however, our task force included a nearby cruiser that quickly eliminated the enemy submarine threat..

Regarding production, we had the northern islands off-line initially, but they're switching over to infantry-unit production to quickly reinforce the newly begun land war on the enemy mainland. Newly captured cities there, however, are staying off-line to help bolster our overall economy rating. Our economy is finally improving, by the way, thanks to the newly captured cities we've gained and the combat losses we've suffered.

Back at home, we've switched our submarine factory and one transport building city to fighter and bomber production. It's time for a steady stream of air units to hop across the dip-

per islands and reinforce the land battles brewing up. Everything now is a race to get to this invasion site "firstest with the mostest." With enough cruisers and airplanes arriving quickly, we can hold on to this piece of real estate for a long, long time.

Stalemate (Part 1)

A stalemate settled in around the enemy's northern coastline. Continuing to act like a giant magnet, it drew our forces inexorably together. Although we initially had superior strength, the enemy was clearly switching his production strategy. More land units were coming up from the south. Also, more of his ships started attacking along each of his coastlines. Presumably, that meant that some of his naval yards were finishing their fleet construction and switching over to land units to eject us from their home continent. We can't be certain without further exploration of his remote coastal areas, but that is what it feels like.

The battles have begun to turn against us. Defeats at sea have made running troops in transports even more risky. Losses on land have mounted, and vast hordes of enemy land forces (with massive air support) have recaptured tenuously held cities along the front (as shown in Figure 11.24). There was only one thing going for us now: Jarvik Bay.

Because of its difficult accessibility (mountains on one side—preventing armor attacks, and water on the other), JARVIK is a very tenable place to defend. By sailing in a cruiser and a battleship to shore-bombard any enemy unit that gets too close, if we can hold on to JARVIK long enough we can regroup our strength around a tighter, more defensible perimeter and reinforce this area for another dash across the enemy's continent. Although both of our aircraft carriers sank recently due to enemy action, there is one

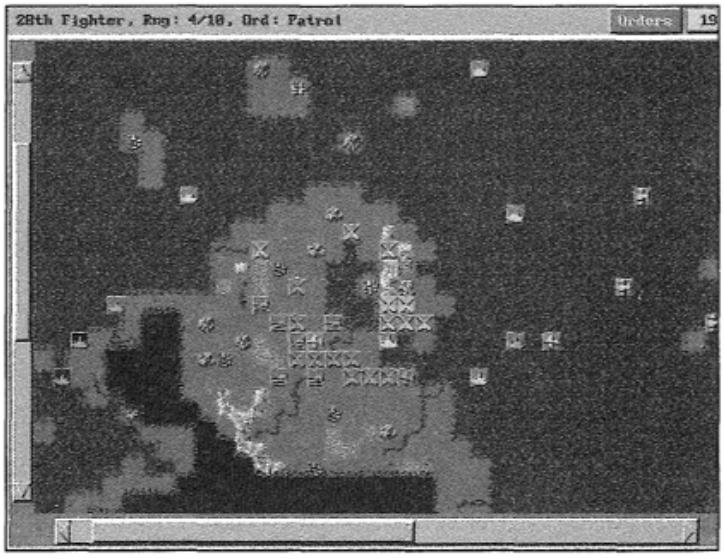


Figure 11.24 The enemy's massive counterattack

air base on the dipper islands that is within 18 squares of JARVIK. We must shuttle over fighters and bombers as fast as they can fly. However, would this "flying cavalry" be enough to stop the enemy's determined drive to throw us back into the sea?

Stalemate (Part 2)

The enemy's luck is almost unbelievable. Two of our battleships and two cruisers lie at the bottom of Jarvik Bay. Even JARVIK itself has fallen. Fortunately, we had several troop transports, packed to the gills, about to land in this area again (as shown in Figure 11.25). We must retake JARVIK, because all of our airplanes have been operating effectively out of it. It is simply too important to let the enemy keep since it is our stepping stone onto his continent. With one of his two west-coast ports, we need it very badly because it is easy to reinforce and difficulty for the enemy to retake from the landward side.

Because of our failure to get a decisive breakout from this area in the north, what we need now is to open up a second front. Stealthily, a cruiser and a destroyer are moving along the

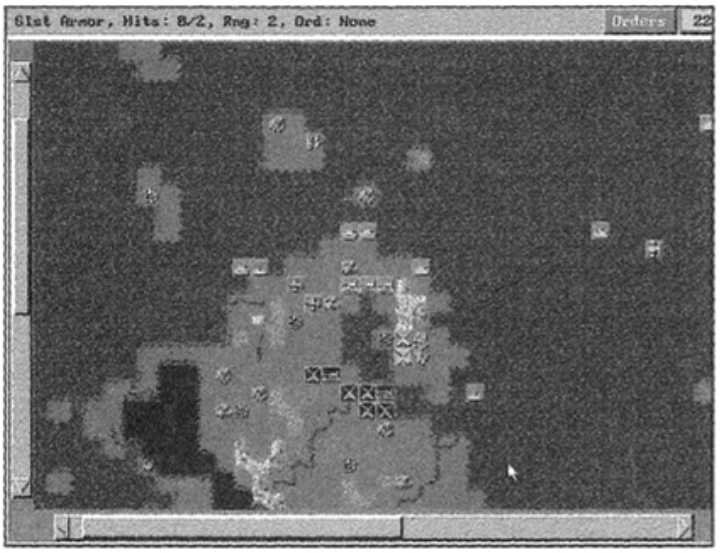


Figure 11.25 Like the Terminator, "I'll be back."

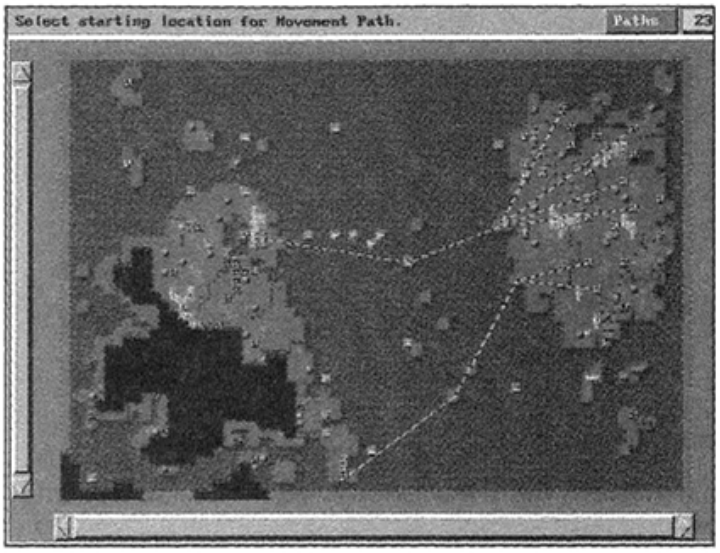


Figure 11.26 Automating our reinforcements

southern map edge toward the closest enemy port, LONELY POINTE. It, too, should be fairly easy to defend thanks to the narrows just to the north of it. These places are where land and sea units interact, so a well-placed heavy ship can stop enemy armies cold with constant shore bombardment. With a second cruiser and a moderate stream of land reinforcements to the area, perhaps we can drive the enemy to distraction in the south. That, in turn, might help us to break out of our entrapped beachheads to the north.

A second front is always a risky proposition. It divides one's forces and allows the enemy, if he is good, to concentrate on each group separately, thus overwhelming each in turn and defeating each front in detail. However, most players, including computer players, do not always respond well when forced to defend multiple fronts.

Opening new fronts is always a gamble. By so increasing the stakes through multiple fronts, the opportunities for gain (and loss) are greatly multiplied. It is a finely calculated risk in sacrificing strategic mass in order to achieve surprise through an unexpected maneuver. A general must have considerable skill (or luck) to emerge victorious when opening a risky second front.

As the situation develops, naturally, the enemy's luck continues to hold. One of his fighters destroyed a tank, three infantry units, and a transport carrying four more armies—*all in a single turn!* Although we got JARVIK back, how long we can hold out there remains problematic. Reinforcements are arriving now in dribs and drabs; only enough to barely hold out with. Gaining a decisive strength advantage in this area appears to be a futile effort.

Fortunately, our landing at SOUTH POINTE caught the enemy napping. Perhaps we'll have better luck reinforcing the south and making things happen there. Figure 11.26 shows the entire map at this juncture, complete with our automated movement paths. We're operating out of two ports and automatically forwarding airplanes to both sectors via path movement.

The Tide Turns

Finally, around turn 266, our luck begins to change and casualties start to even out. A few key battles have gone our way, and the enemy doesn't appear to be anywhere in force anymore. Our constant raiding with loaded transports is beginning to have a positive effect.

Figure 11.27 Things are developing well.

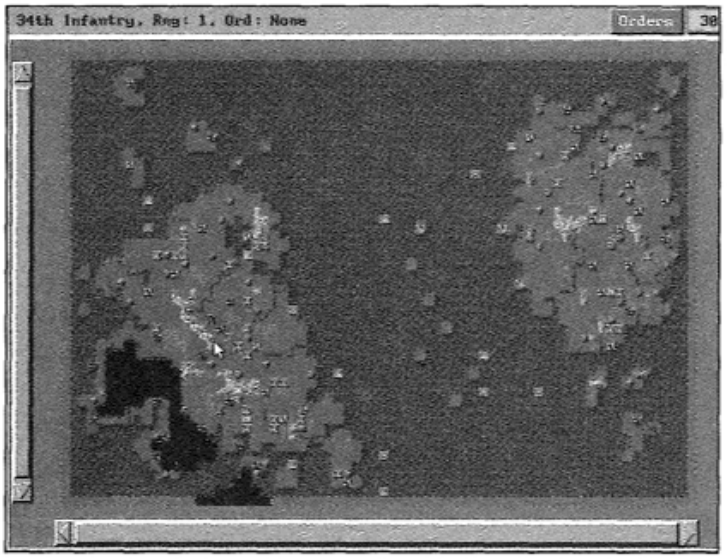


Figure 11.28 The end is near.

Matters have gone particularly well in the south, as shown in Figure 11.27. Undoubtedly, that is what has opened the enemy's defenses and allowed us to concentrate a superior force somewhere against him. By placing a cruiser inside the captured town of OUTER PORT, we've held it against repeated enemy attempts to take it back. This was a risky move, because enemy armor could have popped out of San Jacinto at any time and attacked OUTER PORT (destroying the cruiser if it fell). Fortunately, the enemy had switched to producing mostly infantry, so matters were not so alarming.

With complete control of the middle ocean, our transports are bringing over land units in a steady stream. That, combined with the steady flow of air power, makes the present situation on the map appear like the beginning of the end (see Figure 11.28).

THE END GAME

Persisting in battle, we're beginning to finally wear the enemy down by sheer numbers. With plenty of transports available to us, they are running at less than full capacity, simply to bring the troops over as quickly as possible. Consequently, troops keep pouring in and even some captured enemy cities are now steadily producing for us. Figure 11.28 shows that it's just a matter of time before the enemy resigns.

The White Flag

Sure enough, on the next turn, the enemy surrenders. Figures 11.29 through 11.32 give a pictorial summary of the game's conclusion. In particular,

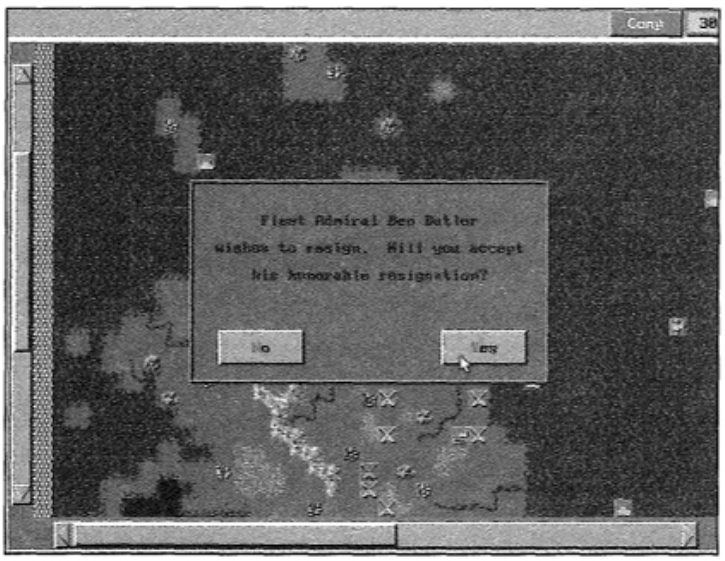


Figure 11.29 The enemy resigns.

Figure 11.30 We're promoted!

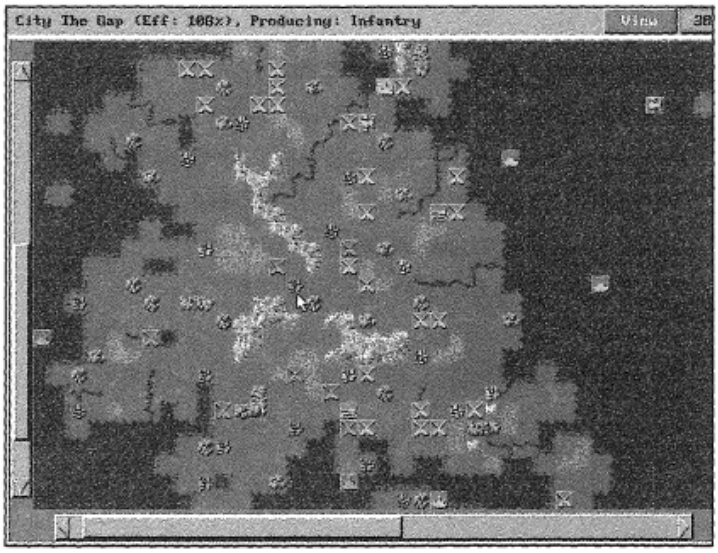


Figure 11.31 When the enemy knew it was time to quit

the Summary Information screen (Figure 11.32) shows that we were producing plenty of units at game's end. What started to snowball about 40 turns ago finally turned into an unstoppable avalanche. After the enemy calculated the odds of continuing the fight (as explained in Chapter 8), he chose the better part of valor.

First Replay Summary

We planned for a long game, and one of some 300 turns is certainly long enough. While

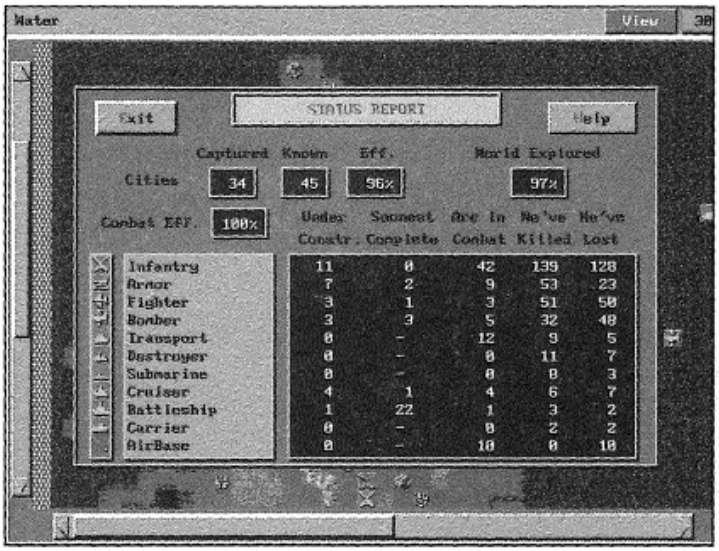


Figure 11.32 The end-game Summary Information screen

invading the enemy's continent, our frequent spying on his cities told quite a story. It was easy to see where all his troops and airplanes were coming from. Most of his city efficiencies were well over 100 percent. Clearly, the computer player was planning for the long game while we were, and had, no doubt, raised several cities' production efficiency. The flood of enemy units (particularly when they appeared unstoppable during the enemy's run of luck) can be easily traced back to the high efficiency of so many enemy cities. In retrospect, bombing more of them once we were on his shores would certainly have helped our war effort.

What allowed us to eventually triumph was our use of superior strategy and tactics. The key was exploiting the computer player's weakness in coordinated efforts, both offensive and defensive. This factor kept the enemy off our beaches during the early game. Later, it allowed us to raid/invade along his vast coastlines and drive his microchips mad not knowing when and where we would strike next. Ultimately, our multiple invasion point strategy paid off in victory.

ANOTHER REPLAY

As a bonus, we'll perform another quick replay, this time showing the early-game stage from a typical *Empire Deluxe* scenario. This game was set up along the lines of a normal, advanced solitaire game, with a full complement of six players fighting over a 100-by-180–square undiscovered wrapping map. The five computer opponents are all experts, and no one has any handicaps. So now, let the (micro)chips fall where they may . . .

INITIAL PRODUCTION STRATEGY

As fate would have it, we're beginning near another city (as shown in Figure 11.33). A quick examination of the map (after saying "No" when asked if our turn was done) shows that neutral city to be MAJUBA HILL with a juicy production efficiency of 138 percent and no production specialty. After changing the name of our starting city to HOME SWEET HOME, we decide to begin by building some quick infantry to take this neighboring city with all speed (see Figure 11.34). With any luck, it will fall to our first or second attack on it.

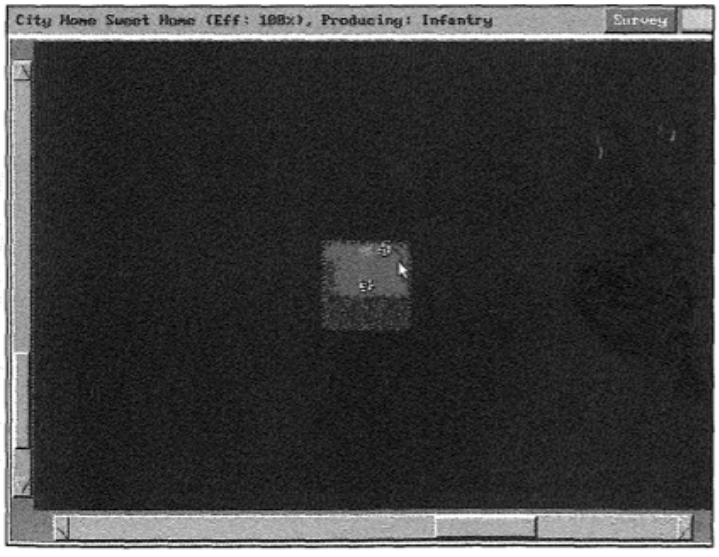


Figure 11.33 Turn 1

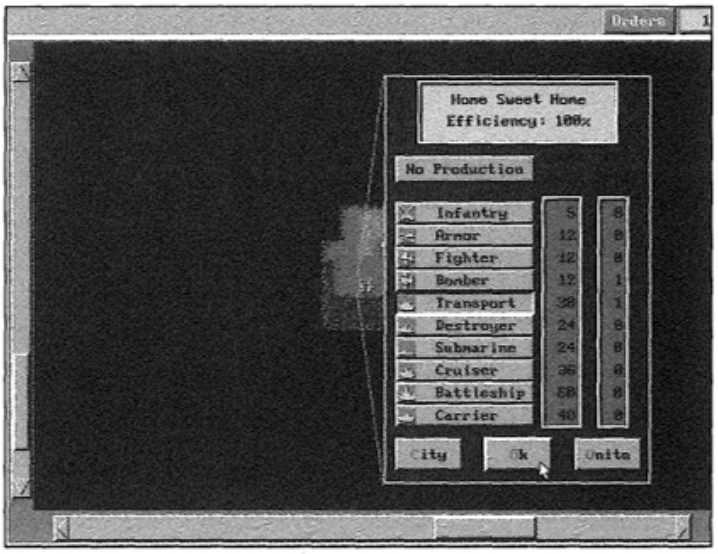


Figure 11.34 It's transport time.

Switching Production

Fortune favors us, and MAJUBA HILL falls to our second attack. Immediately, we start it producing our initial scouting units, this time a bomber. Judging from the low positioning of the scroll bar on the left, we're starting near the bottom edge of the map. This means that we're near a safe edge to the south (which is about the best you can hope for on a world with a wrapping map—i.e., one without any corners to hide in). That assumes, of course, that no other players have started between our position and the bottom map edge.

Figure 11.34 shows us switching HOME SWEET HOME's production from infantry units (after the partially completed army is finished) to a transport. By the time we launch the transport, the bomber will have examined the neighborhood while the city of MAJUBA HILL switches from bomber to army production. Those armies will ride the transport to glory and rapidly secure our early position on the board.

Where Do We Go from Here?

Since MAJUBA HILL is producing infantry units so rapidly, we send three of them off to the far

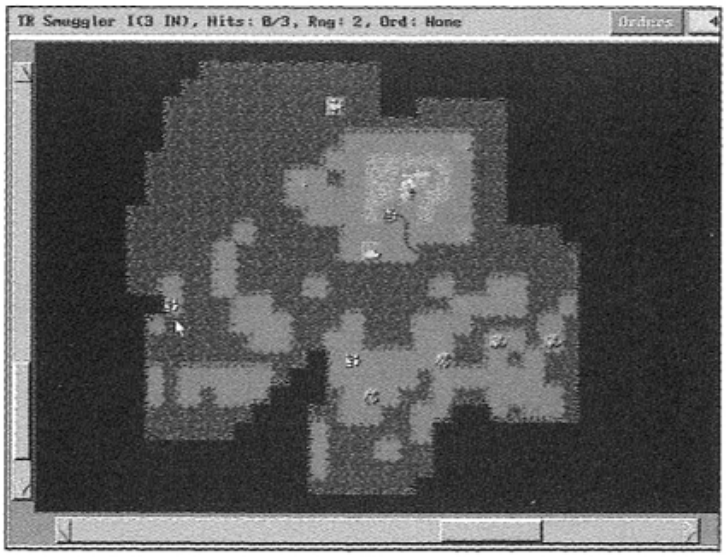


Figure 11.35 The world is opening up.

corners or our starting island and turned into air bases. This will serve both as early warning posts and as springboards for further exploration by our bomber unit.

Figure 11.35 shows the situation on turn 47. The neutral city to the south, WOUNDED KNEE, has a low production efficiency, at 69 percent, and specializes in destroyers. CAMPERDOWN, to the west (where the cursor is pointing), is better for our immediate needs. It has a 96-percent production efficiency and specializes in transports.

With three armies aboard our newly built transport at HOME SWEET HOME (as many as were available when the ship was launched), we switch that city's production to destroyers. These will provide us with some long-range exploration capabilities. We can afford the luxury of early destroyer production, knowing that CAMPERDOWN will soon become our transport factory.

A Lucky Start

Our transport captures Camperdown with one infantry unit and drops the other two units off to try to capture WOUNDED KNEE. Luck is still with us—it falls in one attack. This leaves the other infantry unit there to switch to Auto Explore and see what it can find out about that landmass.

Meanwhile, our bomber has revealed two more cities. The easternmost is, according to Figure 11.36, on a seemingly small landmass. This is the city of OUDENARDE and has a lovely 138-percent production efficiency. Like CAMPERDOWN, it specializes in transport production. (Hmm. Looks like we'll have plenty of transports for this game.)

Another promising city lies on the landmass to the north. Although Yalu River (where the cursor is pointing in Figure 11.36) only has a respectable production efficiency of 94 percent, it specializes in tanks. Since no port is visible on that landmass, and we know that one must exist here (according to the world-generation routines in Chapter 5), there will be at least one other city to conquer on that continent. With three infantry units ready to pick up, we sail them north toward Yalu River. The next boatload will probably head toward OUDENARDE.

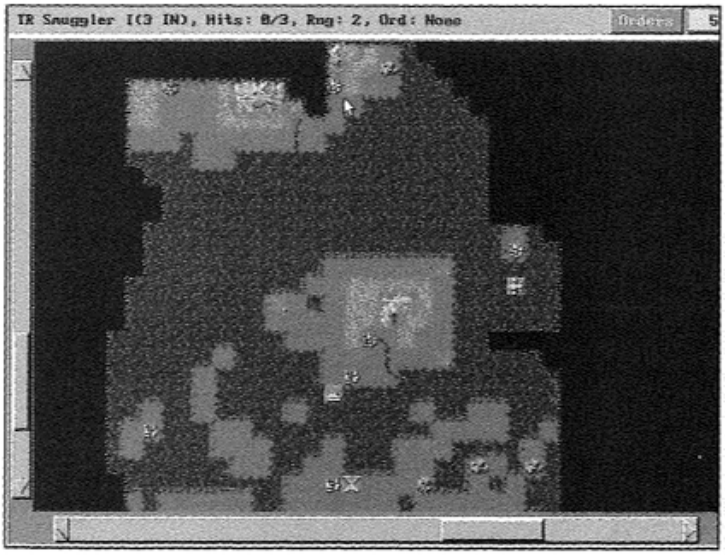


Figure 11.36 A landmass of interest to the north

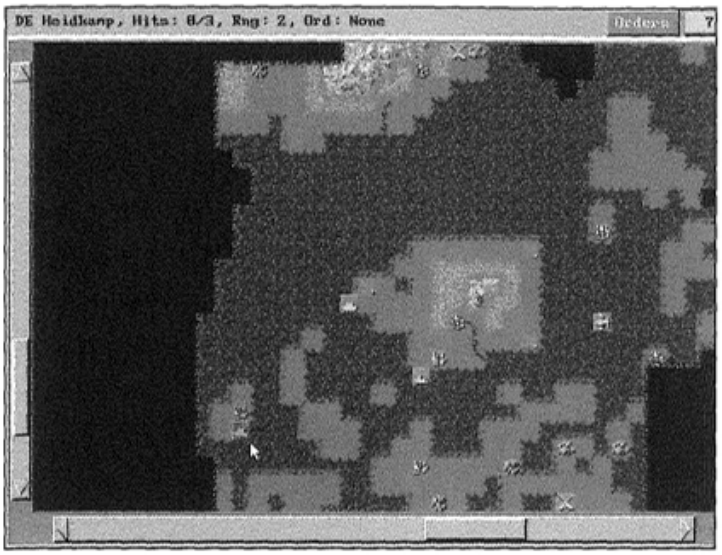


Figure 11.37 The cursor indicates an enemy transport.

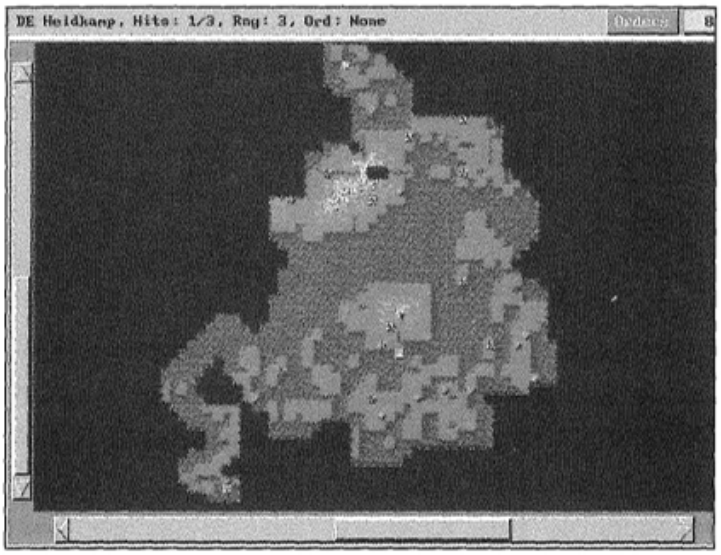


Figure 11.38 The northern continent looks very promising.

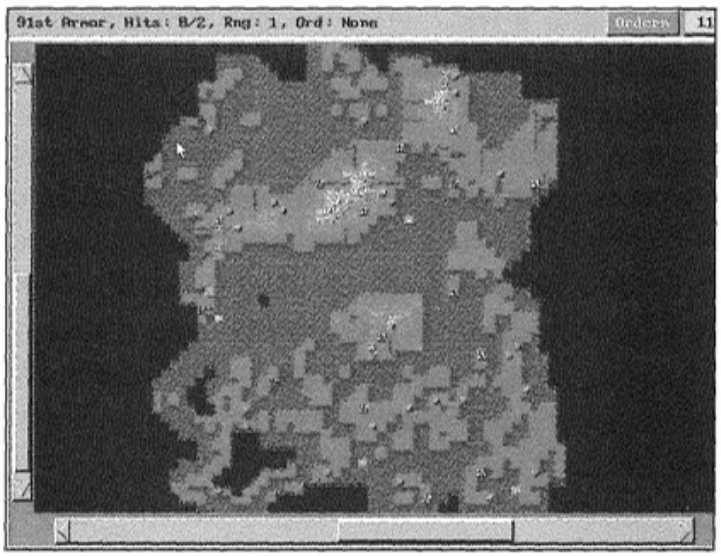


Figure 11.39 A new threat to the northwest

First Contact

Suddenly, on turn 46, our first enemy announces himself to the east. The magenta player sails out of nowhere and captures CAMPERDOWN. On the next turn, our destroyer is launched and sent to explore westward. With an enemy so close, we'd better keep a diligent eye on him.

Before that, Yalu River fell to our first attack, so the other two infantry units fan out and auto-explore the continent there. For the future, it looks like we'll have to capture OUDENARDE quickly and put it to work building transports right away. It looks like we're quickly going to be embroiled in a shooting war. Figure 11.37 illustrates the current, shifting situation on the map.

The Plot Thickens

Although it suffered a point of damage from a magenta fighter attack, our destroyer presses on to discover enemy land units (including an air base) to the southwest. Meanwhile, we discover that the large continent to the north is larger still (see Figures 11.38–11.39). Each of our exploring infantry units bumped into cities, and each managed to capture them! While neither of them is anything to write home about in terms of production efficiency, one of them (MAIWAND) was guarding a crucial land/sea juncture.

To the east, we've secured OUDENARDE and have it building transports, but it fell to the last of the four infantry units aboard our transport, making it expensive to take. Judging by the

overview-sized map presented in Figure 11.40, it is probably time we started building some fighters, both for protection and to further our exploration capabilities.

New Neighbors

Unfortunately, it wasn't long before a new neighbor announced himself. It turned out to be dark blue, who invaded our large continent. After some back-and-forth fighting, the armor being produced at Yalu River carried the day and the continent was secured. Further exploration revealed that dark blue was set up to the northeast (where the cursor is pointing in Figure 11.39).

We sent a transport with four infantry units to take back CAMPERDOWN, the first city we lost. Finally, the fourth unit captured the city, but only after infuriating magenta in the process. Each attack on an enemy city, whether successful or not, greatly increases a computer player's *hate index* toward the attacking player (see Chapter 13). Now it appears that dark blue and magenta are likely to quit fighting each other and start ganging up on us because we've trod on their toes so much in recent turns. *C'est la guerre.*

It seems like the only easy cities left to grab will be to the south and east. Fortunately, the large continent we're on keeps getting larger. One of the cities on it had a high production efficiency and specialized in fighters. With these new scouts rolling off the assembly lines, we're quickly pushing back the blackness. The next boatload of troops will *not* head back to CAMPERDOWN! Instead, we'll send it south and east to grab the neutral cities to our rear.

Party to the North

Egad! Green has just turned up to the north, and sparring began immediately with air battles over the channel. The cursor in Figure 11.40 shows

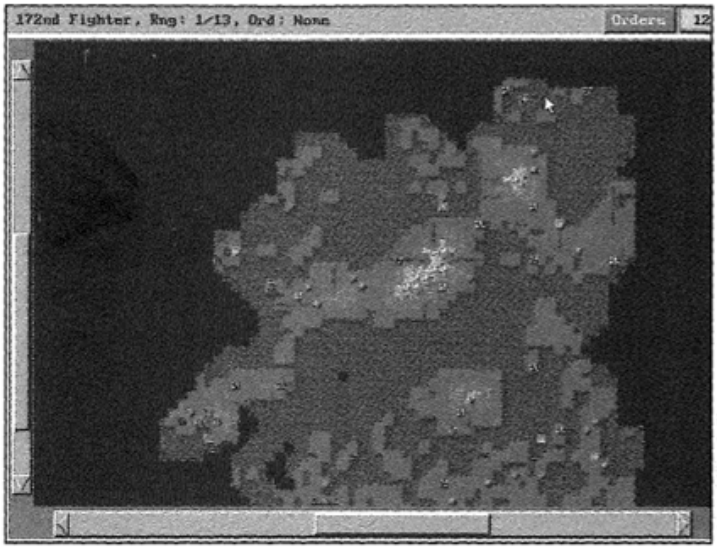


Figure 11.40 Air battles with green begin right away.

the precise location. Fortunately, our fighters removed green's fighter and bomber with ease. Sadly, our perimeter rapidly defines itself by the presence of enemy empires, and we seem boxed in very neatly on three sides. With the map edge to the south and enemies to the north and west, we must probe east and see if there are still some easy neutral cities left to grab. After that, it's time to settle into the middle game. At that point, we'll build up and try to judge which enemy can most quickly and easily be eliminated.

So far, neither magenta nor dark blue have made any kind of all-out assault in our direction. Hopefully, green won't get any ideas either. Meanwhile, a great deal will be at stake over the large, long continent that we hold to the north of our starting position. Because of the long distances involved, we'll build mostly armor units there. These can react quickly to any enemy incursions (and, believe us, they will happen!). Also, airplanes will be essential as "cavalry reserves" to quickly meet the enemy on any beachheads he might obtain on our sovereign continent.

In the rear, we're still building infantry units and transports in tandem, but that is beginning to change. The crucial canal city of MAIWAND

becomes a staging area for transports and tanks to gather. From here, we can either attack dark blue or green, or try to run through the gap between them and see what else is out there. Conversely, the cities are also centrally located for defense of our empire. One thing is certain: MAIWAND is a city that we want never to lose. Its positioning is the linchpin of our empire.

The Final Frontiers

The red player was found, appropriately, to the east. We've sparred with red over several neutral cities as the frontier between us closed (as shown in Figure 11.41). In the area where the cursor is pointing, several important cities have been found. Red is determined to take them, and so are we. It looks like this could drag out for quite a while, but with three loaded transports sailing into this area, the element of surprise just might be ours.

Certainly, the red player seems to have a very high aggressiveness rating (see Chapter 15). Consequently, we may get dragged into a protracted fight with this player. This means that we should secure our other borders defensively and be content to hold there while concentrating as much of our effort as possible on red. So far, the borders with the other players have been quiet, but you never know when that could change.

Production Distances

At this point, we're settling into the middle game where we try to survive and somehow manage to defeat our foes at the same time. Sure enough, dark blue sailed over to the western tip of our large continent and invaded ST. GOTTARD there (for the third time). Since we're building land units at the closest cities to it, they're on their way over to recapture the town yet again. We're even sending a transport with additional reinforcements from MAIWAND just to make sure.

Presently, however, it's time to really consider our economic deployment. That means making sure that we produce land units near the fighting and naval units safely to the rear. Also, it means building a balance of forces, as shown in Figure 11.42. The constant fighting with red and the counterattacks against dark blue prevents us from having a large surplus of land units. Still, there are enough to spare for some invasion sup-

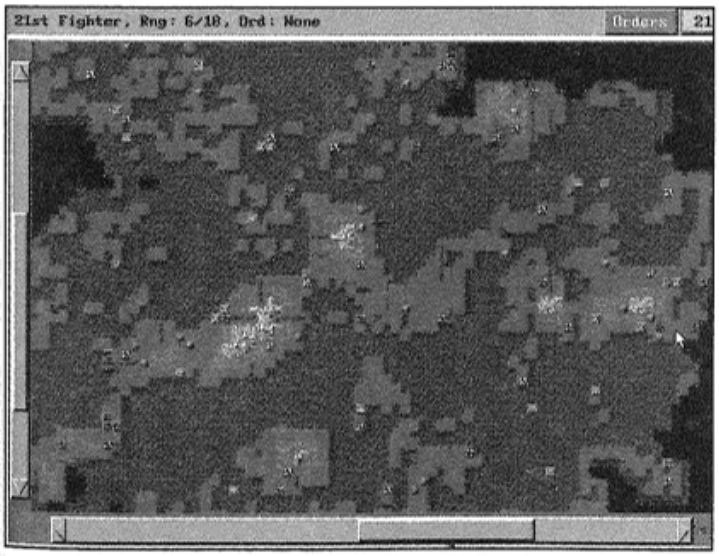


Figure 11.41 The east is red.

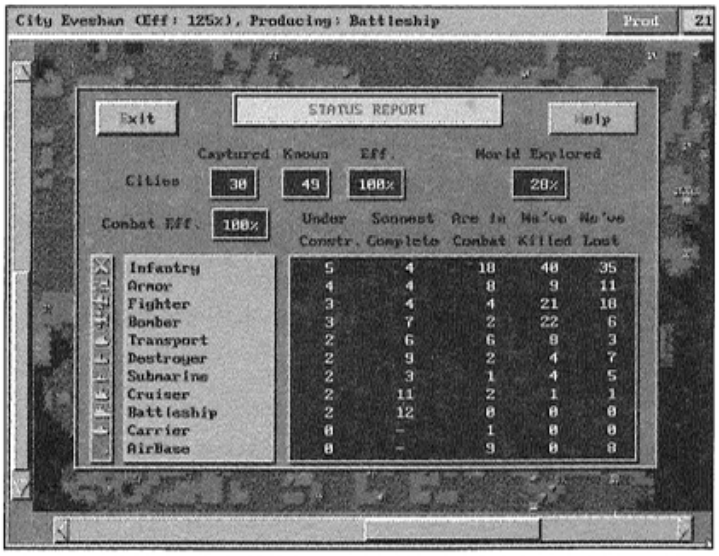


Figure 11.42 Balancing our production needs

port of our land operations and exploration through the gap between dark blue and green.

Presently, however, our needs for a fleet to keep dark blue in check are apparent. Unfortunately, every time we've tried to sail ships to ST. GOTTARD they have met with an ill fate. Now, we're determined to build a solid combined-arms fleet, assemble it at MAIWAND, and then head it over to ST. GOTTARD along the northern coast of the huge continent. At that time, we'll probably also pick up a few transports and invasion troops and try to show dark blue how battle feels by conducting a punitive raid.

The weak part of our wartime economy is probably common to every player on the map. That is, our cities are widely separated. Therefore, it will take time to assemble and move forces to react defensively. Thus, a much needed battleship, for instance, might not only be 25 turns away in production time, it might be *another* 25 turns away in travel time! When empires are this spread out, learning how to make the best use of local forces through superior tactics is the mark of a superior commander. When you can look at the Status screen and see that you are inflicting more casualties than you are taking, rest assured that you're doing something right.

WE INTERRUPT THIS WAR

At this dramatic juncture, we will end this second replay. The purpose of including this bonus replay was to present an example of how to manage the opening moves of a normal solitaire *Empire Deluxe* scenario, up to the point where the frontiers close and the middle game begins. Well, the frontiers have closed on us, the slugfest called the middle game is settling over the map, and, as promised, we're calling it a day.

By now, your solitaire playing skills are sharp—*very* sharp! We can put you up against the best the computer players have to offer, and you will still win more than your share of tough campaigns. Soon you'll be challenging yourself by taking on more handicaps, just to see if you can still beat the computer players despite your hardships. The greater the challenge, the more glorious the victory, right?

Well, the greatest challenge lies ahead in the next chapter. There you will learn how to find and connect up with other human players. Being a skilled general against computer players is one thing. Defeating other human players is something entirely different. Turn the page, and enjoy what will make *Empire Deluxe* fresh and exciting to you forever: new friends and a good game to share with them.

Connectivity:
Landing "Live Ones" to Fight Against—or, Reach Out and Crush Someone

After fine-tuning your skills and studying the hard questions that will improve your play in the previous chapter, you've earned your degree as an *Empire Deluxe* solitaire champion. Now it is time for you to leave your safe little nest of solitaire play and take on a *real* challenge—head-to-head *Empire Deluxe* against real, live human opponents. While the original *Empire* game had some crude (but effective) multi–human-player gaming features, *Empire Deluxe* was designed with a bounty of well-implemented options that allow groups of gamers to connect up and play together.

Empire Deluxe is focused primarily on the single-player playing against the computer, as this is how the majority of players will be playing most of the time. The multi–human-player design elements had to be *fit* around the basic game design, rather than our designing the game to *fit* around the multi–human-player design.

—Bob Rakosky

These enhanced connectivity features particularly will benefit *Empire Deluxe* players who have a modem for their computer. Modems are like tiny telephones that allow your computer to make telephone calls and connect with other computers wherever a telephone line exists. If you don't have a modem yet, you should get one (they're not very expensive when compared with other computer accessories). If you already have a modem but need opponents, this chapter will help you find them.

Unfortunately, there are many references made in this chapter that might sound foreign to those not well versed with modems. While these

passages will make perfect sense to the "modem initiated," that may not mean you. If you are new to this whole world of connectivity, try to read this chapter anyway. Much has been included in it to help explain the mysteries of telecommunication between computers and keep it all interesting for beginners.

THE REALITIES OF TURN-BASED GAMING

Strategy games tend to be one of two types. Many are like board games in that the turn sequence is "I go / you go" (known to gaming wags as "Igo/Hugo"). This means that one player completes his turn while the other player is passive. When the first player is finished, the second player take his turn while the other players are passive, and so on, back and forth.

Some strategy games, such as *Command HQ* from MicroProse, are played in *real time*. This means that events unfold second by second while both players are constantly and simultaneously inputting information to their forces. While real-time play can get a bit frantic (particularly when carefully planned maneuvers evolve into chaotic battles), it can also be quite exciting.

To the questions of real-time games, the argument is that real time is more "realistic." Note that I have done both turn-based games (*Empire Deluxe* and *The Perfect General*) and real-time games (*Star Legions*). Neither format is inherently superior to the other. Each has its place.

Now, it is important for the designer to remember why the game is being designed. Normally, this purpose is entertainment, not *realism*. As such, unless the realism increases the entertainment value, an argument for realism is not important. To add to this, many (most?) real-time games give the player a fairly high frustration level. This is contrary to entertainment and, therefore, would be an argument for turn-based games.

—Mark Baldwin

Personally, I prefer the turn sequencing in *Empire* over the real-time sequencing in *Command HQ*. I tend to design the game flow based on the strengths and weaknesses of approach as related primarily to the single-player mode, because that is the primary mode in which the game will be played. This sometimes has some trade-offs with regard to modem play, but is a necessary compromise (in my humble opinion), unless one is designing solely for modem play.

—Bob Rakosky

Empire Deluxe is a turn-based game. When playing solitaire, your computer's processor will quickly do your opponent's turns and, therefore, you are always kept busy. When playing against other humans, the speed of the game slows down considerably. No human player will move as fast as your computer when playing *Empire Deluxe*. Fortunately, with all of the automated movement commands available to human players, the computer can still greatly assist them and speed up their turns.

THE HUMAN OPPONENT AND I

Certain aspects of *Empire Deluxe* change when you play with human players (other than that there is a general slowing of play). What to do

when it is not your turn, for instance, becomes a major concern (since, most of the time, it may be someone else's turn). In addition to catching up on reading the stack of program documentation books cluttered around your computer area or running off to the bathroom, there are *Empire Deluxe* matters that you can attend to while you're waiting for your turn.

Playing with other humans also opens up some interesting possibilities. Two of the most important ones are diplomacy (which will be the subject of the next chapter) and cheating. Pay attention to both of these new elements. Also, be aware that human players, unlike artificial ones, can resign at any time.

Inactive-Player Activities

In a game where there is only one human player assigned per computer, while another human player is conducting his turn, you can still access certain game functions. This is because the most important thing, your display, remains active, allowing you to scroll around and examine the situation on the board during your opponent's turn. Below is a list of things you can do to improve your position in *Empire Deluxe* while waiting for your turn:

- Note the color of the active player in the Turn Number display located in the upper-right corner of the display. It is *that* player who is currently busy planning your demise. He may also be conducting multiple turns. This occurs to speed up play in the early stages of some games before players are close enough to make contact with each other.
- Keep an eye on your display for enemy activity. Anything the enemy does within the sighting range of your forces appears on your monitor in real time (i.e., as it occurs). Note that everything other players do can be watched again in your next turn's Combat and Recon Reports, so even if you're busy doing something else, you can still catch up on current events during your next turn.
- The period between turns is an excellent time to check and reorganize your economy. Call up the Production Map and/or open individual city production displays and get your economy "just so" (as you learned in Chapter 10). Note that any production changes won't take effect until the beginning of your next turn, at which time they will happen automatically prior to your conducting any activities.
- You also can clear and issue new orders to your units during the lull between your turns. This is a particularly good time to awaken units that should cease to Auto Explore or reroute your automated paths and convoys. Take a moment to be sure that the transport you wanted to unload on the beaches next turn has an Unload order issued to it. Mobilize any garrisons and set new patrol routes as necessary. This is the time to get all of your movement orders exactly right. As with your production changes, any changes you make concerning movement won't take effect until your next turn, at which time they will automatically take place.
- The interlude between your turns is also a good time for electronically *chatting* with others. See the following subsection for details.
- Alternately, this is a good time to use the bathroom or raid the kitchen. World conquerors (like you) should always be comfortable, well fed, and relaxed. You might also want to talk to your spouse, kids, or pet to make sure that they haven't left you for someone less addicted to *Empire Deluxe*.

Chatting

By chatting, we mean sending messages back and forth during the game using the remote messaging facility along the bottom of your display (it appears only in remotely connected, multisystem games—meaning when players are linked together either by modem, by serial connections, or on a network). To chat, click on the Remote Message bar or press [M], and type in your message. The message can be up to 80 characters long. When finished, simply press [Enter] to send it. Sadly, messages cannot be specifically sent to one player only. All messages are shared by every player connected (so much for privacy!).

If you want to emphasize a word, either CAPITALIZE it and/or type it in between a pair of *asterisks* or //slashes//. Additionally, a good deal of on-line slang has evolved over the years since computer users have been communicating with each other via keyboard. You will find they have developed some handy ways for expressing themselves with typed characters. These short cuts to self expression when chatting include:

<g>	a Grin
<eg>	an Evil Grin
<BG>	a Big Grin
<BWG>	a Big, Wide Grin
BTW	By The Way
FWIW	For What It's Worth
FYI	For Your Information
IMHO	In My Humble Opinion
LOL	Laughing Out Loud
ROFL	Rolling On Floor, Laughing
Hehehe	Laughter
:)	A sideways smiley face
:(	A sideways frowning face
;)	A wink
:P	A sideways face with tongue sticking out

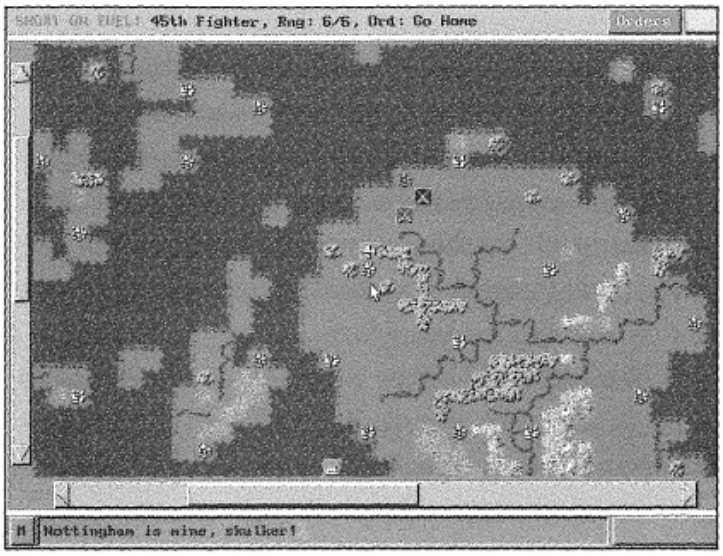


Figure 12.1 Some on-line chit chat threatening game-player Skulker

The text you send will cause other player's Remote Message buttons to blink and, when read, the lettering will be in your player color. Notice that the Remote Message button with the letter M on it is in the lower-left corner of the screen. When activated, messages can be read and written in the adjacent Remote Message bar found along the bottom of the screen, as shown in Figure 12.1. Not surprisingly, [M] is also the hot-key command for selecting this button.

If your message is more than about 50 characters long (depending on the opponent's screen resolution) it won't all fit on the Message bar when it is read. Therefore, the computer will automatically put an ellipsis (. . .) at the end of the first line, and the other players will be able to complete their reading of it by pressing [M] to see the rest of it.

When you have a message waiting, your Remote Message button lights up in the color of the player who sent it (and the text they sent you will also be in that player's color). It has a queue that can hold several messages (up to the computer's available memory), but the color of the Remote Message button will not change from

the player who is first in the queue. Click on the flashing M button, and read your messages. Remember that long messages (over approximately 50 characters) will take a couple of clicks to read in their entirety.

There is one problem with the chat system as initially released on the MS-DOS version of *Empire Deluxe*. We call it *chattus interruptus*. If the pop-up window with the notification that your turn is ready to begin appears while you are typing a message, that message will be lost. If it was important, you'd better type it over again.

Early Resignations

Unlike computer opponents, human opponents can resign whenever they want. At any time during your turn, you can choose the better part of valor and resign the game, as shown in Figure 12.2. The other players will keep playing (unless there was only one other, who wins in that case). All of your units will disappear, and all of your cities, at their current production efficiency, will become neutral.

Figure 12.2 A human player resigning

Cheating

> I will not swear to you that cheating will be impossible, although a person would have to take some extraordinary measures to cheat in a multi-human-player game of *Empire Deluxe*. The bottom line is that you really should have some degree of trust developed with your gaming partners. I consider cheating to be a social problem, not merely some technical problem that I can solve. We protected against the "it's too easy to cheat so that now I can't resist it" types of problems. However, there are limits—this isn't a top-secret, Department-of-Defense–funded program, you know. <G>
>
> —Bob Rakosky

Several places in this book, we've discussed cheating. These were all concerned with how you could try to cheat the computer players. When there are other human players involved in the game, however, it might be *you* who is being cheated.

To protect against one player accessing another's information (and worse, changing his orders), two features have been put into *Empire Deluxe*. In games where there is more than one person playing at the same computer, or when it is being played by electronic mail (known colloquially as *e-mail*, and discussed later on), these protection schemes take effect. In the former case, the screen will blank out between player turns so that your display is not revealed to the next player up. In the latter case, you will be asked for a password, which you must enter at the beginning of the game. Other players in your play-by-e-mail (*PBEM*) game will not be allowed to access your display without your password.

Hearing the Music

> When it is your turn to play again, you will be notified by a musical tune (so you'll know it's time to return from the refrigerator <G>).
>
> —Bob Rakosky

Not only do you get a musical turn to bring your attention back to the game, but each player has a custom tune (see Chapter 15). Thus, you can walk away from your computer between turns as long as you keep your ears open and listen for the sound queue telling you that the other human players are done and they're waiting for *you* now. Of course, there is also a visual prompt on the screen, if you happen to be looking at it. Those who have turned the music off through the ECONFIG.EXE program will only have the visual cue

A New "Good Habit"—Reports!

A word to the wise: When you are notified that you have reports to examine, do so before immersing yourself in your turn.

When playing against human players, it is important to develop another on the list of good habits. When you are notified that it is your turn and greeted by your theme song, the screen, as shown in Figure 12.3a, will tell you if you have any Combat or Recon Reports available. Be sure to check them faithfully, before doing anything else for that turn. They will bring you up to speed on what enemy units were spotted since your last turn and how the enemy's attacks that occurred within your sighting range went. Good commanders examine their reports and get all of their information sorted out before making decisions and issuing their units new orders.

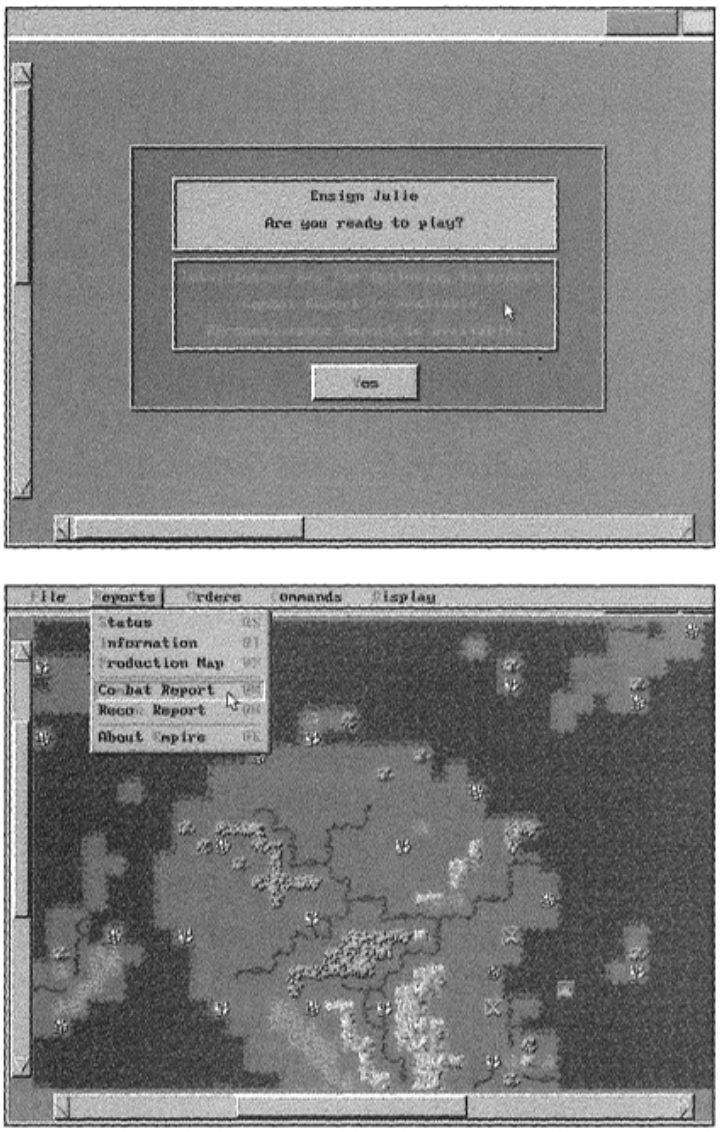


Figure 12.3 (a) Notification that reports are pending. **(b)** Examining the reports via the pull-down menu

(Unfortunately, any decisions you made during the other players' turns were implemented before you had a chance to look at your reports for this turn!)

MULTIPLE PLAYERS ON ONE MACHINE

This is, perhaps, the easiest type of multiple–human-player game to arrange. Just invite some friends over for some gaming fun

(or draft your family into playing), and fire up the computer. During play, the human players will take their respective turns by "hot-seating it" (taking turns sitting on the same chair) in front of the computer.

Well, my friend, I might have a solution for the problem of your wife not playing *your kind* of computer games. As you know, there are three levels to *Empire Deluxe*, one being the Basic Game level. I've had some doubts about its usefulness. However, in mid-January 1993, just to be nice to me, my girlfriend decided to try *Empire Deluxe* at the Basic Game level.

To make a long story short, although she never plays computer games at all, she got hooked! I had to move her to one of my secondary computers just so I could get some work done. Therefore, it is conceivable that your wife just might like *Empire Deluxe*, too.

—Mark Baldwin

While not exactly ideal, logistically, having many players sharing a single computer offers elaborate opportunities for diplomatic arrangements (as will be discussed in the next chapter). When a player's turn is done, the screen will go blank and the next player will be asked to sit down. Just be sure to watch your back and make sure that no one is looking over your shoulder to see where your pieces are while you're moving them!

MULTIPLE-HUMAN-PLAYERS ON THEIR OWN MACHINES

There are basically three ways to have multiple human players in a game, with each on his or her own machine—through either modem, null modem (also known as *serial*), or network connections (or some combination of these). While the setup procedures are clearly described in the "Playing with Other Computers" section of the manual, be sure to read the section, later in this chapter, on "The 'Real World' of Telecommunications". Connecting multiple computers together in *any* fashion is still not an exact science, so don't be discouraged if things don't work as you expect them to on the first try. Eventually, with a little persistence, you'll figure out whatever the little problems are that might arise, and be able to sort them out.

I would strongly recommend that if you set up a game involving computer players as well as multiple human players, you use the fastest machine to actually do the game setup (i.e., be the *master computer*), because the computer players will *reside* on that system.

—Bob Rakosky

The concept of linking multiple computers together to play *Empire Deluxe* has one comput-

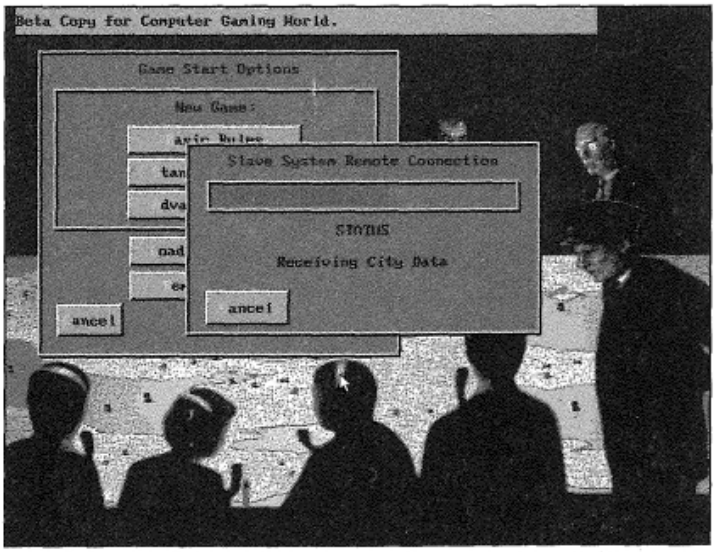


Figure 12.4 Data being received

er serving as the host, or *master* computer. The other computers used become subservient terminals to it, or *slaves*. The player on the master computer will select the game variation or scenario to be played and serve as the hub of all the other computer connections. As Bob Rakosky (White Wolf's modem master) said, "you should use whoever has the computer with the fastest processor as the master unit since that is where all of the number crunching gets done and where all of the computer opponents live."

Empire Deluxe on a Network

Networks are usually found at offices, but as people acquire new personal computers and keep their old ones, at-home networks will continue to become more popular as well. For the record, *Empire Deluxe* can be played on any network that provides (or emulates) a NetBIOS network communication standard. This includes the LANtastic, plus the Novell and Novell Lite networks (using its provided NetBIOS driver).

Playing by Electronic Mail

The basic design of *Empire Deluxe* does allow for changing the player type for any or all players when reloading a saved game. This allows a human player (either playing on the local system or formerly playing by modem / network) to be changed over to computer control and vice versa.

However, if we allowed this capability with PBEM games, it is much too easy and tempting to cheat and temporarily load the PBEM-saved game and change the player types to get a sneak peek at your opponent's position. Consequently, in the PBEM mode we've had to disable a number of features, such as changing of player types on reload and the saving of game maps and scenarios from the middle of a game in progress.

One of the ways that we do address some of the concerns with a player not being able to continue with a PBEM game is that we do allow an individual player to *resign*. If there are three or more players involved in the PBEM game, one player's resignation will just cause his units to be eliminated and his cities to revert to neutral status. The remaining players in the game can then continue it.

We really put a lot of thought into this design issue before implementing it. I strongly feel that the *security* issue in PBEM mode is important, because it's too easy to develop doubts about an opponent who is always kicking your butt <G>. It's not perfect, but someone will have to really do their homework to find a way to cheat. Frankly, it won't be easy, or worth it, if they do.

—Bob Rakosky

There is a great difference between playing *Empire Deluxe* by electronic mail (*PBEM*) and playing it any other way. The most significant difference is that, when finished with your turn, the game is saved as a computer file that must be sent on to the next player. That player then plays his turn, saves it, and sends that saved game on to the next player he's prompted to send it to, and so on . These files are usually transferred over a modem via electronic mail, although saving a game to disk and using the regular (snail) mail would work as well (albeit more slowly). Thus, there are no elements of concurrent player activity in a PBEM game of *Empire Deluxe*.

Considering the turnaround time for an average player's turn by electronic mail, and the number of turns required to finish a normal game of *Empire Deluxe*, PBEM games can last over a period of several weeks. However, this has long been a popular method for playing *Empire* and, with up to six players allowed in a single game (including computer players), should prove even more popular with players of *Empire Deluxe* who have modems.

To set up a PBEM game of *Empire Deluxe*, just select your human opponents to be PBEM players when setting up the game. Note that playing *Empire Deluxe* by electronic mail prohibits any other type of human opponents (i.e., those connected directly, by network or modem) but does allow for computer opponents to join in the game.

THE "TEAM" GAME

One possible way to play *Empire Deluxe* is with a *team* arrangement. There are several ways that teams can be formed: three teams of two players each and two teams of two or three players each. Team games without an equal number of players on all sides can be balanced out by applying player handicaps to the side with more players. A great way to play a team game is to have each team share a computer and have all the computers connected remotely (via modem or network).

As a supplement to the manual, Bob Rakosky has provided the following module that provides a walk-through for connecting machines together for team play.

Here is the game flow of a team game with a two–computer-system connection:

First, one player will set up the game. This will be the master system used (and should be the computer with the fastest processor speed). Let's say that there are going to be two human players on our opponent's system and two humans on ours. Let's also say that he'll be the master system and will connect to us via modem.

In the Player Setup, he'll arrange for two players as Local Human (himself and his teammate) and two others as Remote-Com# (# being whatever COM port he's using for his modem). Of course, he can set the remaining two players to be computer opponents, if desired. He then continues to go into the game, at which time the modem connection will be made. There is no difference here for the methods used for a one-on-one modem connection as described in the manual.

On the other system, we also will be going through the Remote Slave procedures. The first player on our team will provide his *Empire Deluxe* Player Name when asked. After the connection is made, the window should look like the one shown in Figure 12.5. Note that there will be an extra button available in the window, Add Local Player.

We should select this button and pick from

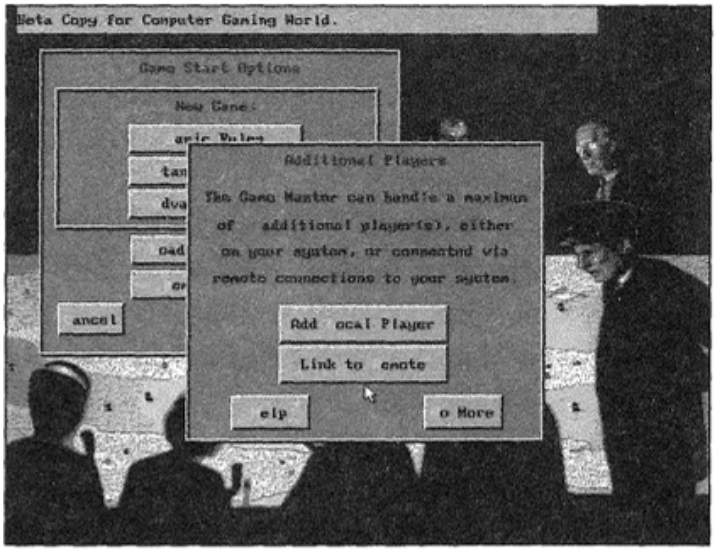


Figure 12.5 Setting up for a team game of *Empire Deluxe*. Here, the slave computer is asked where his teammate will be, either at the same machine or connecting from another remote machine.

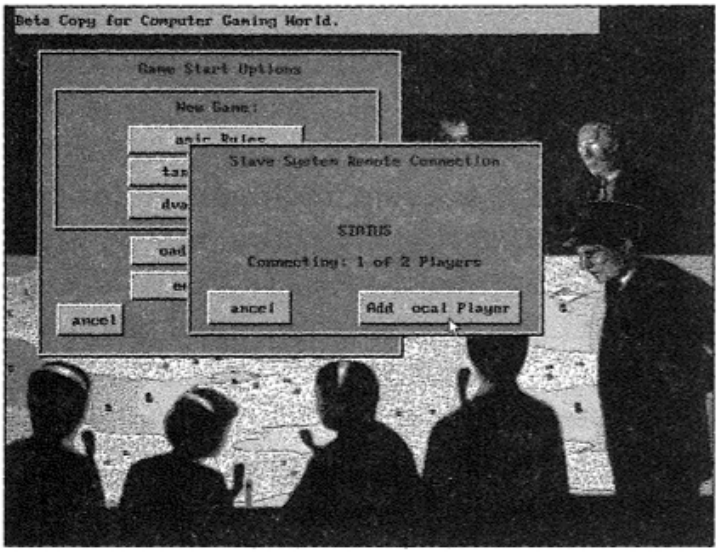


Figure 12.6 The Add-L0cal-Player modem connect screen

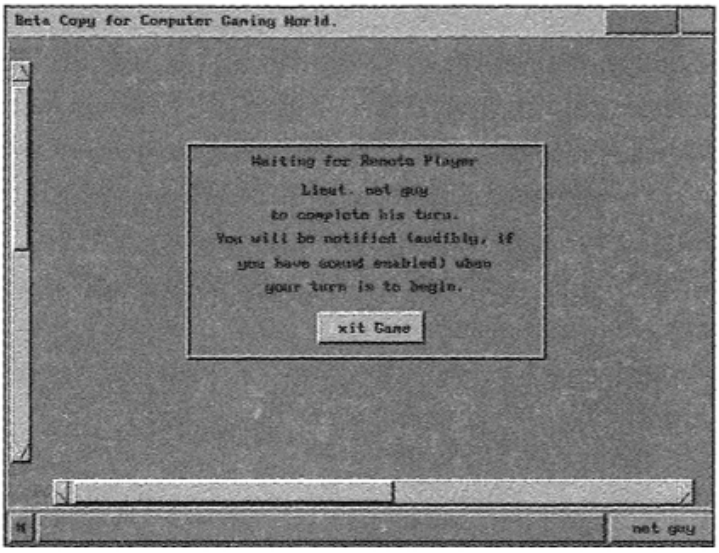


Figure 12.7 The remote-player waiting screen

the three options given: Add Local Player, Link to Remote, and No More. The second option is what is used to establish a daisy-chain connection to another computer via a connection different (that is, COM port or network) from the slave system. The first option allows for adding a second (or subsequent) human player on our system.

In this example, we will select the Add Local Player button, as shown in Figure 12.7, and will be prompted for our teammate's name. The game will then proceed as normal, with the game setup data, map, and so forth, being transferred from the master computer to us. Then the game itself will begin.

The major difference during actual game play of a team game is that, since there may be more than one human player sharing a single computer, the displays will be disabled when it is another player's turn. Thus, the real-time aspects of remote play (being able to order your pieces and adjust your economy) are not available for these types of team games when it is not your turn. Instead, it is much more like a multi–human-player game on a single system. Even though the real-time display of events is not available, as always, your Combat Report and Reconnaissance Report will be available during each turn in which an enemy sighting or combat takes place.

While one of the remote players is in control, the display is blanked and the dialogue box shown in Figure 12.7 is displayed. There is also an Exit Game button available for those seeking an emergency bail-out.

Warning: There is *no* confirmation prompt that follows selecting the Exit Game button. One click there, and you're history.

Please note that *Empire Deluxe* was not designed for any kind of team play, and the arrangements suggested here could quickly deteriorate to the game's intended cutthroat competition at any time. The game does not provide any means of enforcing team-player status or of awarding a player any more knowledge about his teammate's forces than it does about the enemy's. Teammate scenarios are an arbitrary edifice that require good-spirited human-player cooperation.

As an interesting variation, remove the human-player-team concept and simply have each player command two colors. One color could have a large production handicap while the other would have a large combat handicap

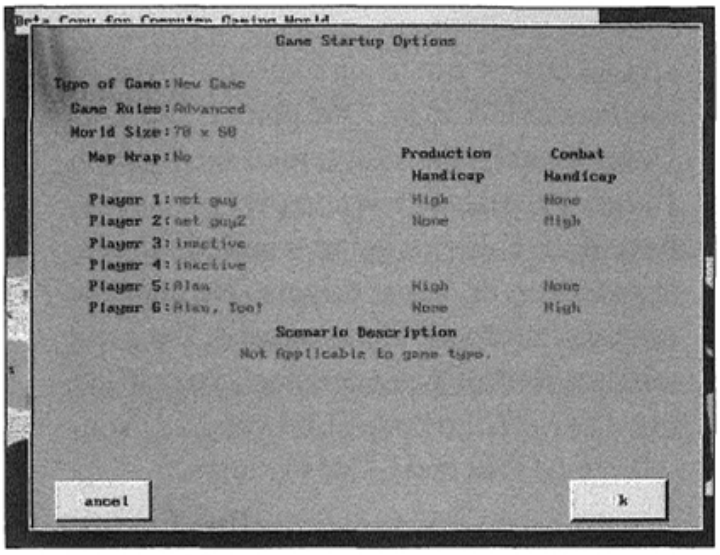


Figure 12.8 The team-game startup options screen

(as shown in Figure 12.8). Thus, each player would have a mix with many poor fighting units and a few excellent fighting ones at their disposal. Adding in some computer players as common enemies can add further spice to the situation. Good luck!

CHOOSING A SCENARIO

The scenario editor in *Empire Deluxe* is one of the more powerful ones available in current commercial game designs. Ironically, this important feature isn't very democratic since the host player is the one who selects it (the slave units cannot choose scenarios). So, if you are going to be the host player, it is common courtesy to spend some pregame time describing or negotiating what scenario is to be played. Naturally, the standard, every-man-for-himself, randomly generated scenario makes a good default choice (although the map size, wrap, and number of computer players should still be discussed), but you might want to try a pregenerated scenario when playing with several other human players. See Chapter 14 for all of the considerations for custom scenario design.

WHAT TO DO IF YOU DON'T HAVE A MODEM

Chances are, by now, that you are probably interested in playing *Empire Deluxe* with fellow gamers by modem. This allows you to spend a weekend afternoon playing with anyone from around the world by connecting your computers together via your telephone line. (Of course, paying the telephone bill for a four-hour overseas call is another matter). It is a wonderful experience and one the authors recommend most highly recommend that you try.

If you don't have a modem and would like to buy one, skip to the special section entitled "The Modem and I" at the end of this chapter. It has been provided as a primer on the subject of computer telecommunications and should give you enough background information for you to shop intelligently and troubleshoot any problems you may have when trying to connect with other players. The rest of this chapter will help you find other human players and survive the perils of the imperfect "real world" of telecommunications.

THE "REAL WORLD" OF TELECOMMUNICATIONS

We will begin this section with a special introduction into the logistics of coordinating multi–human-player games. Special thanks are due Roger-Tzu White and *Computer Gaming World* magazine from which this section is reprinted with permission. (Although originally written for another game, *Global Conquest*, it has been adapted here to apply to *Empire Deluxe*.) This primer will help you get a feel for the challenges of hosting several human players by modem connection and, being thus forewarned, will prepare you for any early disap-

pointments that may occur when you first try to connect everyone together. Persevere, however, for in the end, you will figure it out, and the effort will be well worth it.

In the Kingdom of Multi–Human-Player Computer Gaming, the Person with the Most Phone Lines and Modems Shall Be King

Computers can talk to each other, but few computer games take advantage of this. It's even rarer to find a computer game that talks to many other computers and becomes a multiplayer, multimachine game. *Empire Deluxe* is one of those games. It is also a game that shows why multimachine gaming is still rare—making a game happen with more than two human players connected is an elaborate task.

In Search of a Host

The first thing to do in setting up such a game of *Empire Deluxe* is to find the computer that will be the host, or master, unit. The host is the computer that is equipped with most COM ports and connects these to other computers by either direct serial connections or telephone lines. It helps if the host is also a fast computer (one with a quick processing speed), because all the other computers will be relaying information from it throughout the game.

> The real problem with IRQ-sharing [see Appendix B for an explanation of this term] is that the PC-bus architecture does not support IRQ-sharing. If two devices on the bus are configured to generate the same interrupt, neither of them will function reliably. This is a hardware issue.
>
> Some programs do manage to get around this by not using interrupt-driver routines to talk to a COM port. Unfortunately, the structure of the *Empire Deluxe* program is too complex for us to have been able to support a polled-IO approach to the serial drivers. We need the reliable interrupts. Consequently, the game will not work if you are using two conflicting devices (like both COM1 and COM3 or both COM2 and COM4). Sorry!
>
> —Bob Rakosky

In Search of a Fourth (Fifth, or Even Sixth!) Player

The next challenge is common to bridge, doubles tennis, and any other four-player game: finding the fourth player (and, in the case of *Empire Deluxe*, the problem increases geometrically when seeking a fifth or sixth player). Two enthusiasts can usually find a third quickly, but the fourth and subsequent players always seem to be more elusive. Rustling up additional players for *Empire Deluxe* is greatly aided by access to an electronic forum of gamers such as CompuServe's *Modem Games Forum* or a gamer's Bulletin Board System (discussed later). A side benefit of finding players electronically is that anyone who uses an electronic forum generally knows how to use a modem. This can be a great plus should anything go awry (as often initially happens).

Can You Walk and Chew Gum at the Same Time?

Making three or more modem connections happen in quick succession is like saying "Peter Piper picked . . ." three times, fast—other play-

ers should applaud the host when the connecting process is completed. Following are some hints to smooth out the connection process.

1. Call and coordinate on voice with all the players just before the connections are attempted. Let them know what order they will call or be called in. Also confirm their modem phone numbers and BAUD rates. Tell them how long they should wait before they should try calling you to find out what sort of snafu, if any, may have happened.
2. Call your most patient player first. This person must endure watching a connection that does nothing for several minutes while all the other connections are being made.
3. In the real world of telecommunications, things rarely work right the first time. Connecting up a four-or-more-player game of *Empire Deluxe* is "real-world telecommunications" amplified manifold, so plan on it taking a while just to get the game going. A rule of thumb is to allow a half-hour of setup time for the game, and add another half-hour for each player you've never made a modem connection with before. If this is your first try at being a host, test each of your modem connections locally the day before the big event to make sure that *your* system is not going to be the cause of any technical glitch.

WHO YA GONNA CALL?

A modem, once acquired, is worthless if you don't use it. What often happens is that a new modem owner simply doesn't know who to call. In the case of *Empire Deluxe* players, the trick is to find other enthusiasts out there with modems, standing by and waiting for a challenge from you. This section deals with the various ways to meet other computer-gaming enthusiasts so that you can arrange all the games of *Empire Deluxe* you want.

Connecting Up to the Outside World (An Overview)

In order to meet people, you have to *network*. People in marketing, sales, or politics, particularly, know the value of social networking. Networking is far easier for computer gamers who seek opponents when they have modems. That is because there are certain places where computer gamers hang out and can be easily contacted.

Basically, there are four ways to find other computer-gaming enthusiasts. The surest way is to join one of the large computer networks, each of which has a special area designated for exchanging information on games. They will charge a competitive fee, and you can get a lot more out of them than just *Empire Deluxe* opponents.

Likewise, there are the Bulletin Board Services (BBS), both local and national, where you can tap in to search for fellow gamers. Bulletin boards are often hit-or-miss propositions, however. One computer game magazine, *Computer Gaming World*, offers free "opponents wanted" listings in every other issue. From personal experience, we can tell you that the response there is very good.

Finally, regional game conventions are often held by local board gamers (you can find the best listings of them in *The Dragon* magazine). While these conventions are not primarily focused on computer games, many computer gamers attend them. Thus, you can easily make some friends there and see if they also share your interest in computer gaming by modem. The beauty of these contacts is that they will be, primarily, local opponents. Thus, playing them by modem will save you a fortune on your phone bill!

THE BIG COMPUTER-NETWORKS

A network is a huge system that connects your computer to the world. Imagine being able to dial a number and have your computer tap into the lives of tens and even hundreds of thousands of people. This is exactly what happens when you connect with one of the big computer networks—CompuServe, GEnie, Prodigy, America Online, or The Sierra Network.

These networks are inhabited by just plain folks like you, some of whom will be avid gamers and *Empire Deluxe* players. The people you meet on-line are usually extremely friendly and helpful to new members. On-line gamers can find each other through various designated meeting places on the networks (usually in the area set aside for gamers—it is an extremely popular on-line activity) and communicate by posting and answering bulletins to each other. Each person has an on-line *address* where bulletins and private electronic mail (e-mail) can be sent. Many game manufacturers frequent these networks as well, and offer the latest revisions to players as free *downloads* from the network information libraries. As if all that weren't enough, many game designers (such as Mark Baldwin and Bob Rakosky) have accounts on these networks and can be easily reached there to answer rules and other questions personally.

Each network has its own procedure for joining, but they are similar in many ways. Generally, when you join up, you must give them all kinds of billing information about yourself (including either a credit card or checking-account number). They will then automatically bill you for usage. Billing is always based on either a flat fee, a per-hour charge, special fees for special services, or, more likely, some combination of all these. Prices vary by network, and the competition between them is always affecting prices. Be sure to shop carefully for the best price and services when selecting a computer network. Now, let's take a quick look at the big networks, one at a time.

CompuServe

The CompuServe Information Service is the granddaddy of all the on-line information utilities and is owned by H&R Block. It was founded in 1969 and has grown to include hundreds (1,500+) of databases and close to a million subscribers. While CompuServe contains the broadest spectrum of information categories, it has, since its inception, devoted a significant amount of energy to computer gaming in particular. Once you are connected to CompuServe, the areas you should investigate for modem game playing are the following:

Modem Games Forum: A forum that brings gamers together from around the world to discuss any and all aspects of games that support modem play. This forum features an electronic bulletin board for message correspondence, data libraries for file exchanging, and conference rooms for real-time interactive discussions. Type GO MODEM to access it.

Challenge Board: This is an electronic directory of registered modem game players. Participants profile themselves in this directory so that other gamers can search for them as opponents for most commercial, public-domain, and shareware games that support a play-by-modem feature. Type GO CHALLENGE to access it.

Empire Deluxe should work in CompuServe's *MTM Lobby*. There is even the ability within the game itself to log onto CIS, to into the MTM area, establish the game connection, play the game, break

the MTM game connection, and log off, all without having to resort to loading an external terminal program.

What I had hoped (and strongly hinted to some CIS folks at a recent Computer Game Developer's Conference) was for the ability to connect more than two machines together, since *Empire Deluxe* will support up to six of them. However, this does not appear to currently be possible given the current arrangements used by CompuServe.

—Bob Rakosky

MTM Lobby: This lobby features on-line playing and is the latest entry into CompuServe's modem-to-modem games support services. It allows players to connect their modem-capable games to opponents through the CompuServe network. The *MTM Lobby* affords players the convenience of staying on-line for all aspects of modem gaming, connects them to international opponents for no more than the price of a standard domestic long-distance phone call, offers both player's anonymity since neither party needs to give out their phone number to connect, and offers each gamer the opportunity to choose from hundreds of potential opponents. *Empire Deluxe* is playable through this lobby, although only two systems can be hooked up together through it (a CompuServe limitation). Still, it's great for head-to-head and team games. Type GO MTMLOBBY to access it.

Gamers Forum: This is a very active on-line special-interest group devoted to computer games and simulations. Join fellow players, designers, writers, and programmers in exchanging hints, reviews, and product information. Type GO GAMERS to access it.

Game Publishers Forums (both A and B): These are specific, on-line areas devoted to technical support for a myriad of entertainment products available from many game companies. Here, you can talk directly to company representatives with your questions and suggestions. Also, the latest program updates are posted in this forum's library for downloading. Type GO GAMAPUB or GO GAMBPUB to access them.

For more information, contact:

CompuServe, Inc.
P.O. Box 20212
Columbus, OH 43220
Voice: (800) 848-8199
Fax: (614) 457-0348

GEnie

The *GE* in GEnie stands for General Electric, the owners of this particular network. Founded in 1985, GEnie is approaching a half million subscribers. GEnie is probably the network best supported by important names in the game industry (both board and computer games), with a Games Round Table area that has a dizzying array of subjects and topics to choose from for all your gaming needs. When connected to GEnie, type M 805 at the ? prompt to get to this particular section, which is hosted by Scorpia. Here, you will be in gamer information heaven.

A second area of interest to computer gamers is the Computer Game Design RoundTable, hosted by Chris Crawford. This is a more cerebral area where design philosophy and industry politics are discussed by important persons in the computer gaming "biz." To access this area, type M 935 at the ? prompt.

For more information, contact:

General Electric Information Services, Inc.
401 North Washington Street
Rockville, MD 20850
Voice: (301) 340-4000
Fax: (301) 2551-6421

Prodigy

From its extremely humble beginnings in 1984, Prodigy has grown to a dominant size among the big networks, surpassing their combined total number of users. Prodigy is a joint venture of Sears and IBM, and, with their aggressive marketing and extremely easy to use user interface that is loaded with graphics, this service has grown to over two million users.

Like Goliath, Prodigy's strength is also the source of its weakness. Prodigy is a friendly, family-oriented, graphically intense network. This, however, makes Prodigy slower to use than the other networks due to all the graphic enhancements (now that they've established a 9600-BAUD service, however, that problem is far more manageable). The friendly, family-oriented element means that bulletins are closely monitored and unsuitable subjects and language are promptly censored. Additionally, as a byproduct of being built, originally, as a flat-fee system, Prodigy has been supported by advertisers who have their commercials running along the bottom of the screen each time it refreshes.

With no real ability (yet) to upload files to share with others and only some limited download capabilities, Prodigy is at a real disadvantage for active computer gamers who like to share files. That there is an additional charge for e-mail and bulletin-board messages after a monthly quota is used up also weighs in the balance against the benefit of access to Prodigy's huge audience. Still, many modem gamers can be found on the bulletin boards of Prodigy and can be reached by typing GAME CENTER on the Jump command on-line. *Computer Gaming World* magazine is the on-line expert there (their Prodigy address is EXPT40B).

For more information, contact:

Prodigy Service Company
445 Hamilton Avenue
White Plains, NY 10601
Voice: (914) 993-8000

America Online

America Online was founded in 1989 and is one of the smallest of the big networks—but they are growing quickly. An independent enterprise, it is the only one that is not a subsidiary of some huge corporation. Consequently, America Online is more of an "anything goes" network where freedom of expression and individuality have been raised to an art form. Like Prodigy, it uses an attractive, graphic *front end* (special software for connecting with the network) and is extremely easy to use. While not exactly a panacea for gamers, it is a fun hangout with all the services of the larger networks (on-line chat, file uploading/downloading, large libraries, special-interest groups, e-mail, and gaming areas). There is a particularly warm and friendly community on America Online, and it is a comfortable network to start on.

For more information, contact:

America Online, Inc.
8619 Westwood Center Drive
Vienna, VA 22182
Voice: (800) 227-6364
Fax: (703) 883-1509

The Sierra Network

Lovingly known as TSN, The Sierra Network is a nonstop party for gamers with a computer and a modem. Offering a host of computerized board and card games (including chess, bridge, cribbage, poker, and many more) plus a bevy of other specialized computer games (including the *Red Baron* combat-flight simulation and *The Shadow of Yserbius* role-playing game), every game played is live, in real time with another human connected to the network at that moment. Those signing on create on-screen personas and enjoy what is, essentially, an on-line game convention that never closes. While the e-mail sys-

tem is not well suited for PBEM gaming, there are no huge databases to access, nor are you able to upload or download files with others, one thing is certain: everyone on TSN likes games. Since it's a 100-percent gamer network, your chances of connecting with someone special (like an *Empire Deluxe* opponent) on TSN are pretty good. (Coincidentally, Alan Emrich even met his wife on TSN).

For more information, simply call 1-800-SIERRA-1.

THE BBS's

A Bulletin Board System (BBS) usually offers many of the features of the larger networks, but with much more localized interest areas and smaller user bases. There are so many private BBS's that it is very difficult to keep track of them all. Almost anyone with a computer, a modem, and a separate telephone number can start a BBS (and many people do).

Bulletin Board Systems were developed soon after microcomputers began to appear and began as "telecommunications for the common man." They are often free of charge (except for the toll charges from Ma Bell). Over the years, thousands of BBS's, some of which have had as many as 32 modem lines operating, have sprung up. Some can even boast of thousands of members and countless files available for them to access.

Honestly, the best way to stay on top of all the various BBS's out there (so you can pick up on the ones that interest you—particularly gaming ones) is to subscribe to *Boardwatch* magazine.

For more information, contact:

Boardwatch
5970 South Vivian Street
Littleton, CO 80127
Voice: (303) 973-6038

Other, gamer-specific BBS's can be found in the "Opponents wanted" listings in *Computer Gaming World* magazine. The other best way to find good BBS numbers to call is to ask the friends with modems that you'll make. In any case, it is better to start your search for *Empire Deluxe* opponents on one of the big networks rather than a local BBS.

COMPUTER GAMING WORLD MAGAZINE

The astute reader, having made the connection that the co-author of this book (Alan Emrich) is an editor at *Computer Gaming World* magazine, will be expecting a shameless plug for same. Well, here it is.

The oldest magazine covering computer gaming on all its platforms, *Computer Gaming World* focuses on games for personal computers and writes for a mature audience. With an inside track on industry news, the staple of each issue remains the game reviews and previews, strategy tips, and related features. The "Computer Wargaming World" section is a magazine within the magazine, and caters specifically to computer war and strategy gamers (like you).

In the "Computer Wargaming World" section, in every other issue, you will find the "Opponents wanted" department, where networks, BBS's, and individual players place free ads seeking to connect with fellow gamers. Many specialized BBS's and local *Empire Deluxe* players can be found listed here. You should be, too.

Computer Gaming World magazine is available at most major newsstands, or, to subscribe for 12, thick monthly issues, call (800) 827-4450. The price for a one-year subscription in the U.S. or Canada is only $28.

LOCAL GAMING CONVENTIONS

Yes, there really are gaming conventions where scores, hundreds, and even thousands of gamers attend to play all kinds of games (including computer games) over entire weekends (particularly long, holiday weekends), Often, the dedicated gamers there play around the clock, 24-hours a day. While board and role-playing games are usually featured, many of the gamers attending these conventions also have computers with modems and would be happy to set up matches with you. They are a delight to attend in any case, and well worth a look.

The best place to find a current, comprehensive listing of game conventions is in *The Dragon* magazine, published by TSR, Inc. (the people who make *Dungeons and Dragons*). *The Dragon* can be found at most newsstands or can be subscribed to at the rate of $27 for 12 monthly issues by writing to TSR, Inc., P.O. Box 5695, Boston, MA 02206.

CREATING YOUR OWN PHONE BOOK OF GAMERS

By fishing for *Empire Deluxe* opponents in these places, you will soon make many new friends and learn about the other games that they enjoy playing. It is probably a good idea from the outset to get a separate address book, just for information on these new gaming buddies. By including their various phone numbers (home, work, modem, fax, etc.), on-line addresses, playing interests, etc., you'll have a handy resource book for finding that one extra human player you'll need for your next game. It's a satisfying book to keep and a proud symbol of your networking with other gamers.

THE MODEM AND I (A PRIMER BY FRANK "TURK" BARTOLOTTA)

While it is possible to have two players play against each other on the same computer, this is not a very ergonomically comfortable way to go. The key word, then, for play against other human opponents is *connectivity*. Here, the magic lies in the connection of two or more computers, running the *Empire Deluxe* program in concert.

When broken down to the basics, connectivity may be achieved in one of two ways: one way is through a physical connection between two computers in relative proximity to each other. The other way permits remote connections through telephone lines.

The first method involves a direct connection from one computer's serial port to another computer's serial port with a special cable known as a null-modem cable. The second method involves the use of a modem to send and receive data communication over telephone lines.

What is this *modem* that keeps being referred to? If you asked this question, then you are about to discover the wonderful world of telecommunications. . . .

Getting a modem is like getting your first microwave, computer, or VCR. Once you learn how it works, you will wonder how you ever got along without one. Like all the other aforementioned technological wonders of the modern age, a modem will take some getting used to, and understanding a few of the basics here is a good beginning. Since modems and telecommunications are an important enhancement to the *Empire Deluxe* play experience (and they are becoming increasingly more prevalent in computer gaming in general), allow me to present a few quick, fundamental concepts.

Everything You Always Wanted to Know About a Modem, But Were Afraid to Ask On-Line

Modem is a shorthand name for modulator/demodulator. Since the computer processes data in a digital format (i.e., every piece of information is seen as if it were an electrical circuit in either an *on* or *off* state, which is called a *bit* in computer lingo), some interface is necessary to convert this information into audible sounds (known as *analog signals*) for transmission over telephone lines. The modem that initiates the phone call does the translation of data into analog signals.

The modem at the receiving end then converts these analog signals back to digital signals (bits) for the computer on that end to digest. This process goes on back and forth between the two computers through their modems as information is being transmitted and received. Each modem is both a transmitter (modulating digital signals into analog signals) and a receiver (demodulating analog signals back into digital signals); thus, they speak to each other by sending these sounds back and forth to each other over the telephone line and converting them back into their proper bits.

In addition to the data itself being transferred back and forth, there is also a continuous audible tone. This is that awful screeching sound that you hear if you don't turn the sound off when using a modem. This is called a *carrier signal* (which is concurrently being transferred back and forth along with the analog signals). The carrier signal enables the modems to monitor the connection. When one modem detects a loss of the carrier signal, the connection is broken and the modems will hang up.

Modems come in two flavors, internal and external. The internal modem is on a card that plugs into a slot inside your computer. For those who are a bit queasy about opening up their computers, there is the external modem. This is a free-standing little box with a power switch and a number of lights. It gets connected from the outside to one of the serial ports on your computer.

Serial ports, and their connecting cables, come in both the 9-pin (*DB9*) and 25-pin (*DB25*) varieties. Most computers contain at least two serial ports, and these are commonly known as COM1 and COM2. While you may have more COM ports, rarely will the average user have more than four. While internal modems are generally cheaper than external ones (and save some desk space), they have a major drawback that can be crucial when debugging failed modem connections: no external control signal lights.

The Esoterica of Control Signals Made Easy

Control signals are the means by which you may detect and monitor the status of a modem connection (or lack of it). The carrier signal previously mentioned is a control signal. The modem's use of these control signals is referred to as *handshaking*. Different brands of modems use varying control signals. Set forth below are the most common control signal lights:

Modem Ready (MR) or Data Set Ready (DSR): Your modem's power is on, and the modem is connected to a telephone line for normal operation.

Terminal Ready (TR) or Data Terminal Ready (DTR): Your modem's power is on, communications software is loaded, and the modem is ready to transmit and receive data.

Send Data (SD) or Transmit Data (TD): Data is being sent from your computer, through your modem, to the remote modem.

Receive Data (RD): Data is being received from the remote modem, through your modem and into your computer.

Off Hook (OH): Your modem has picked up a telephone line in preparation for dialing.

Carrier Detected (CD) or Data Carrier Detected (DCD): Your modem and the remote modem have connected on-line and are ready to exchange data.

Automatic Answer (AA): Your modem has been placed in *host mode* and will automatically answer any incoming call.

Request to Send (RTS or RS): The computer is asking your modem if it may begin transmitting data.

Clear to Send (CTS or CS): Your modem signals your computer to start sending data.

High Speed (HS): Your modem is operating at its highest base speed. This won't account for increased speed through the use of data compression (e.g., a 9600-baud modem's HS light will go on when communicating at 9600 or above).

Error Correction (EC): The modem is using its error-correction mode.

Data Compression (DC): The modem is using data-compression protocol to increase data *throughput* (or *transmission speed*).

Thus, the *idiot lights* on your external modem corresponding to these control signals provide valuable information. They let you know if your connection is successful and what is (or is not) happening when it is unsuccessful. Otherwise, you can be sitting there waiting for a modem connection when no connection has been made. While most games will eventually tell you that there is a connection problem, the control lights available on external modems can save you a little money, time, and aggravation. I recommend them highly for game use.

BAUD Rates

Another important element of telecommunications for game play is the modem BAUD rate. The BAUD rate is the speed at which modems exchange data (the higher, the faster). BAUD rates vary from 300 to 57,600. However, recent technology advances have made the 300 and 1200 BAUD rates obsolete. Most games now support the faster baud rates of 2400 and 9600 BAUD, or even higher. (Note, however, that many of the big computer networks charge a premium for using their services at higher BAUD rates.)

What does this all mean to you, the modem gamer? Simply put, higher BAUD rates mean faster data transmission. With more games supporting faster modems, think ahead. If you set out to buy a new modem, buy the fastest modem you can afford. You will probably not notice the difference with *Empire Deluxe*. Future game releases (particularly simulations) are likely to have their game play greatly enhanced at faster BAUD rates.

Communications Programs

In general, a communications program is the means by which your modem is instructed what to do. If you think about it, every modem game is, in effect, a communications program of sorts (although limited in scope). While communications programs are not, generally, relevant to playing modem games, they are important in providing you with the means to access information about games.

With a standard or specialized communications program (such as ProComm) you will be able to access the information services and BBS's described later so that you can share information with other modem gamers, give comments to and

get help from modem-game publishers, and receive patches and files related to games through the process known as downloading.

However, I would advise the serious modem game player to learn as much about modems and telecommunications as possible. In addition to helping your ability to debug modem-game problems when they occur, there is a big world of information out there on games (and anything else you can imagine) that becomes available to you with a modem, a telephone line, and a little knowledge how to use them. The networks and on-line services that have been discussed are a whole new frontier of discovery just waiting for you to tap into them with your modem.

HANGING UP, OR REACH OUT AND CRUSH SOMEONE

Whew! There was quite a lot of information in this chapter about using telecommunications to play *Empire Deluxe* with other human players. Still, the thrill of challenging another human brain makes it all worth it. You've been presented with enough places to look to find opponents so that you will never have to play solo again (unless, of course, you want to).

When you're hooked up with several "live ones," however, an interesting new element can be added to a game of *Empire Deluxe*: that is, diplomacy. Yes, good old back stabbing and ganging up can become a part of your winning strategy in *Empire Deluxe*, and we want to show you where to stick the knife (and teach you how to duck when it comes at you). We will examine the diplomatic possibilities of *Empire Deluxe* in the next chapter.

Multi-player Diplomacy

Whenever you find yourself in a game with more than one other player, the door opens for personal diplomacy. Make no bones about it—*Empire Deluxe* does not in any way feature diplomacy. However, while the game makes no provisions for formalized, enforceable diplomatic agreements (and its opposite, ruthless treachery), much can be done informally. Although we cannot give you a knife-proof back, we will try to help you navigate through the murky seas of interplayer diplomacy in *Empire Deluxe*.

> *Empire Deluxe* makes no provisions for diplomacy. It is war to the finish and to the victor goes the spoils.
>
> —The *Empire Deluxe* game manual, page 28

This chapter will help you to get the most out of the limited diplomacy allowed in *Empire Deluxe*. You will find out how to improve your diplomatic position and how to ruin your enemy's, and what to do when the diplomatic tide goes out and you are left high and dry. We will even give you some insight into what makes the computer players hate other players.

NOTHING VENTURED, NOTHING GAINED

The goal of diplomacy is simple: to improve your position. Diplomacy, however, does so by mobilizing OPFs (Other People's Forces). It is yet another tool in the toolbox of victory, and one that should be used wherever it might be applicable.

Recalling your good habits from Chapter 4, the crucial fifth habit was to take a mental step back every 10 to 15 turns and survey your situation. Among the checklist of things to consider was to "Weigh again your diplomatic situation, both with other human players and computer players. Make plans for improving your situation and worsening the enemy's."

Let us begin this adventure into the minds of our adversaries with the easiest opponent first—the computer opponent. Let us take a trip through the source code of *Empire Deluxe*'s programming and see what makes the computer players prefer to attack one opponent in preference to another. In programmer lingo, this is known as a *variable* called *hate*.

THE COMPUTER PLAYER'S HATE INDEX

When a computer player in *Empire Deluxe* has to make a decision, it checks a lot of variable elements first. Each of these variables are translated into a numeric value and, when combined, give a total weight to each possible decision a computer player might make. Naturally, when computer players have to decide between doing A or B, they will tend to give preference to the option with the most numeric weight. The more weight one option has over another, the more likely it is that the computer player will do it.

Perhaps the greatest single question a computer player faces in *Empire Deluxe* when confronted by multiple enemies is, "Whom do I attack?" This is a question asked by computer players repeatedly, and, among the many variables involved in that decision (and many others made by computer players throughout the game, by the way) is a program variable known as hate. While the actual formula used to answer the question is complex, it can be explained quite simply: the more hate a computer player has toward another player, the more likely that player will be the subject of his wrath.

If there are only two players in the game, hate is irrelevant. Hate is also not considered when playing under the Basic Game rules. Under the Standard and Advanced Game rules, however, each computer player keeps a scorecard or index, if you will, of how much they hate every other player in the game. What follows is how the numbers work when your artificial opponent considers his hate.

What Makes Hate Go Up

You increase a computer player's hate toward you by five points per attack against his units. It does not matter if you win or lose (or even if you win and destroy extra units aboard a transport or carrier); you still increase that computer player's hate toward you by five points. Similarly, attacking one of his cities will increase his hate variable for you by *10* points.

Each player can only be hated up to a ceiling of 100 points. At five and 10 points per attack, however, this is a ceiling that can quickly be reached. This is because when you try to take one of his cities, say, and lose five armies in the process, you will have angered that computer player five times as much as if it fell to your first attack. Think about that.

Computer player hate is also a relative thing. If you're hated for five points by a particular computer player, who doesn't hate anyone else at all, he won't concentrate all of his energy against you. Instead, he may lean slightly toward attacking you in preference to others (five points worth on a scale of 100, to be precise), but he won't decide to arbitrarily wage total war against you when you have such a relatively low hate level with him. In other words, the danger increases as your hate index with that computer player increases.

What Makes Hate Go Down

Every computer player's hate variables are reduced by one point per turn toward all players, automatically. Thus, over time, if you can avoid attacking a particular player who hates you long enough, you can get back into his electronic good graces.

Notes to Hate

To predict your first question, the answer is No: human players do not begin a game with computer players already hating them, nor to their hate numbers rise any faster than those of another computer player. Computer players hate justly, without preconceived prejudice. They are equal-opportunity hot heads. Although you'll never be able to see a computer player's hate numbers, Mark Baldwin assures us that they are on the level. (Really!)

As you can appreciate by looking at the easy rise and slow fall of a player's hate variable in relation to a computer player, patching things up can be a long, slow process. Whether or not it is worth it, however, is up to you.

Diplomacy to Hate

Diplomacy must be included as part of your grand strategy. Attacking in two directions at once is dangerous because it not only divides your forces, but makes you two enemies at the same time. Diplomacy must also be considered in tactical matters. In other words, even if there is a tempting enemy city that you can easily capture, there will be times when it is better not to, and avoid earning that player's long-tern enmity. The opportunity to gain a cheap city victory at another player's expense must be weighed against the possibility of a protracted war for which you might not yet be fully prepared.

Therefore, when you are playing a perfect diplomatic game against computer players, one of them will hate you at 100 points (the one you are currently subduing) while the others have you at or near zero hate points. Let the computer players hate and fight each other while you concentrate on one enemy at a time. It may be wise to suffer the blows of one computer adversary and let them go unanswered by you to keep your hate variable low with that player so that you can concentrate your energy on another. Eventually, the computer player whose attack you are suffering will hate someone else more if you remain passive toward him long enough. The question then becomes, how much will you lose in the meantime?

An interesting phenomenon with the way the hate variable works is that "blood feuds" will often develop between pairs of computer players (particularly between aggressive ones, see Chapter 15). They will bump into each other and quickly lock horns in battle. After several attacks are made or a few cities change hands, they will start to develop a kind of tunnel vision and apply so much of their energy toward subduing each other that they give low priority to furthering their exploration or expanding into unconquered neutral territories to fuel their economy. Naturally, this is an ideal development for you, a human player. After they have worn themselves out, you will probably have expanded quite a bit and will be ready to crush the victor of the feud with ease.

THE POSSIBILITIES OF MULTI–HUMAN-PLAYER GAMES

Although the only way to deal successfully with a computer player diplomatically is to passively let your hate rating with him drop, human opponents are another matter entirely. Since it is possible to bend the will of a human player to your cause, giving you at least a chance of making a deal, a more proactive type of diplomacy is called for. Failing that, you can always attempt to demoralize a human opponent in hopes of getting a premature resignation out of him—something that computer players are not susceptible to.

The great problem with playing against human opponents is that they are unpredictable. This is particularly noticeable after you have

played repeated games of *Empire Deluxe* solitaire and can best the artificial opponents with some regularity. Human players simply will not do things exactly the way the computer players always do (as described in detail in Chapter 15). Human players will gang up on you on a whim and make wide, sneaky maneuvers and terrorize your rear areas. They will taunt you with messages on the Chat bar and even build enough transports so that they will always be a threat. However, human players can also talk to you and, with a little diplomacy, can become, at least temporarily, an asset instead of a liability to your strategic goal of world domination.

THE FIRST RULE OF DIPLOMACY: AVOID BEING GANGED UP ON

You are losing the *war of diplomacy* when others gang up on you. You are holding your own in the diplomatic war if you can avoid being ganged up on. Whenever you are heavily engaged in fighting more than one opponent at a time, you must strain every nerve and try every trick to reverse that losing diplomatic situation, because their combined strength could eliminate you. How? See the second rule of diplomacy, below.

THE SECOND RULE OF DIPLOMACY: GANG UP ON OTHERS AND ELIMINATE THEM

You are losing the diplomatic battles when you are ganged up on, and holding your own when you're not, but you are winning on the diplomatic front when you can convince others to join you in ganging up on somebody else. It is the pinnacle of diplomatic achievement to lead an alliance against a common enemy (and, particularly, to have your allies bear the brunt of the fighting and take most of the casualties while you manage to get more than your share of the spoils). It is the deepest abyss of diplomatic failure to be the common enemy to others.

Diplomacy, therefore, is like marketing. You must sell some of the players in the game on the idea that someone else is their real enemy—not you (at least, not yet). While it is easy to point out the strongest player and unite the weaker ones against him, lest they be crushed separately, there is a problem. In *Empire Deluxe*, you'll often be playing a scenario where other player's strengths must be discovered. How do you really know who the strongest player is during the early and middle stages of a game when everyone has relative parity?

At that point, you must switch from marketing to salesmanship. Convince yourself that one player is too large and needs to be cut down to size. After you have sold yourself, evangelize and sell others on the idea. Unfortunately, few of us are born salesmen.

However, we can only tell you in this book what has to be done, and recommend a method of doing it. Teaching effective marketing and salesmanship techniques is beyond the scope of this book and will require outside research if you're really serious about doing it well. However, here is a great secret of salesmanship: *fear of loss is a greater motivator than opportunity for gain.* If you want to get another player to move now, remind him of what he stands to lose if he doesn't.

Pregame Diplomacy

Finding a common enemy to rally against also works well in a different way. If you studied at the Roger "Bleed Them" White (a.k.a. Roger-Tzu) school of diplomacy, you may have already been a victim of this method (and learned it the hard way). Roger teaches that it is a good technique, before the game begins, to inform all the

new players how good "The Victim" is and how they should watch out for him.

Naturally, The Victim will go down in flames when the other players gang up on him from the outset. Since The Victim was set up from the beginning as the perceived common threat, the use of this preplanned paranoia tactic can be devastating. (By the way, if anyone should ever tell you what good players Alan Emrich or Mark "skulker" Carroll are at *Empire Deluxe*, don't believe a word of it. <g>)

The Us (Humans) Versus Them (Computer Players) Truce

There is often one easy sell in the diplomatic wars of multiple-human-player games of *Empire Deluxe*. Whenever you find yourself in a game where there are enough computer players in it to be a serious threat to the other human players, try this Us versus Them technique.

Computer players make perfect common enemies because they can't protest, nor will they appeal to other players in an effort to end a multiplayer alliance against them. Often, by your throwing out a line such as, "Let's not fight each other until the computer players are under control" will buy you at least a truce from your fellow sentients. After all, what self-respecting human player wants to lose to a computer player?

Consider that although this technique buys you time by focusing the enemy's attention away from you, it has its drawbacks. In particular, making sure that you get the lion's share of the spoils from the defeated computer player without looking as though you are cheating your ally is a neat trick. Also, eventually that common computer-player enemy will be subdued. Now, instead of a computer player on your border, there is a (once friendly) human general to face. Perhaps even more diplomatic skills will be required by you now that circumstances changed and your border opposition shifts from computer to human players.

The Real Estate Agent in You

Most diplomacy in *Empire Deluxe* boils down to the ownership of land. Defining mutually recognized borders can be a tricky business. Think about what the other person wants, and always talk in terms of his needs. Plans like expanding in opposite directions early on are usually easy to sell to another human player. Buffer zones and neutral areas (perhaps monitored by an air base and a patrolling airplane on it) can also make for agreeable, mutually secure borders. Some players might even accept definitions of hostile actions, such as moving ships (especially transports) in a given area. Find the tools that work best for your diplomacy, and use them.

THE THIRD RULE OF DIPLOMACY: THE EASY GIVEAWAY

While selling another human player on a common foe may be tricky, selling them rewards isn't nearly as difficult. Everyone likes to hear about the good things they're going to get, and the easiest thing to promise is what you don't own (politicians make a wonderful living doing exactly that). For example, if I wanted to ally with you, I would promise you half of some third player's empire. It didn't cost me a thing to promise you that, and now you're thinking about the half of an empire you'll be reigning over.

By telling you all about the rewards without mentioning the dirty costs involved (in time and lost resources required to crush that third party), I am selling the sizzle and not the steak. Be sure to keep this little technique in your diplomatic pouch as well.

COMMUNICATION SKILLS

If you are going to negotiate anything, you must learn to communicate. In *Empire Deluxe*, this often means sharpening your typing skills, for play via modem requires that your messages be typed to each other while you are in Chat mode. You don't have to be a great speller, but being a fast typist is a definite plus.

Don't feel too bad if you send a lot of messages and get few in return. People love to receive mail, after all, but few enjoy writing it. That's all right—you're only asking for two letters in the reply to one of your missives, anyway: "OK." To win the diplomatic war, expect to do the brunt of the typing. After all, you're trying to shape the alliances on the board to best suit you, and typing however many messages it takes is the price of that.

Hard-Core Diplomacy

Effective diplomacy often requires a great deal of communication. *Empire Deluxe*'s chat mode, with its open-air communications for all the other players to see, is hardly the ideal channel. If you are really serious about diplomacy, consider talking a bit with the players before the game, and, if you have enough telephone lines, establish a private voice link with them during play. All's fair in love and war, right? And having their private ear is a much easier medium to work in than trying to catch their eye in public.

Communicating with an Ally

Recalling the nine principles of war in Chapter 8, we see that two of them had particular application when dealing with other human players as your allies. First, let us consider the principle of unity of command. While alliances are generally useful, to be effective, one player's forces must, ultimately, be subordinate to the another player. Only when forces are marshaled under a single will can there be unity of command and a complete singleness of purpose. When you make alliances with others, unify the command under only one of you. Preferably, your combined forces will be under your well-tutored and wily command. It make take some finagling, but you must unify your command, even if under your ally's leadership instead of your own.

Simplicity is the other principle. In *Empire Deluxe* this is particularly important when advising an ally how to marshal his forces. When communicating instructions for others to carry out, the simpler they are, the more likely they will be carried out as planned. Complex instructions are far more likely to frustrate an ally and, therefore, to be misinterpreted or simply ignored. Obviously, that could lead to disasters (both military and diplomatic) that are best avoided, so stick with a K.I.S.S. policy (Keep It Simple, Stupid).

For example, "Attack the island, in force, from the east on turn 137" is a fairly simple order. On the other hand, "Attack the island on turn 137. Move the landing in from the east, but feint with an aircraft carrier from the north with lots of air raids. Also, be sure to lead with battleships because a lot of shore bombardment can be anticipated. After taking the initial city, build an air base to the south and set up patrols" is a complicated set of orders. You can't micromanage the other player's moves. Keep your orders simple, and hope he has the sound tactical skills required to carry them out.

NO-FAULT VERSUS DOWN-AND-DIRTY DIVORCE

Alliances are considered to be political promises, and, therefore, it is generally understood that they are made to be broken. Those who have

studied in the Oldies School of Musical Relationships know that "breaking up is hard to do," but that there are "fifty ways to leave your lover" (er, ally). Like Santa Claus, we've divided them into two categories, the naughty and the nice. In this section, we will consider the latter first and begin probing the benefits of a no-fault divorce.

Diplomatic Durations

One issue that you will need to address with an ally early on is how long your relationship with this partner is going to be. The shorter the relationship, the more reward you will gain from *defecting* (i.e., ending it). Here are some choices for how long this relationship is going to be:

1. It will last a turn.
2. It will last until a certain condition is met (i.e., such as a third player is no longer a threat or an established boundary is violated).
3. It will last for the duration of the game.
4. It will last for the duration of many games.
5. It will last a lifetime.

To ease up on the hard feelings that will show up when the time comes to defect, make sure that the person you are playing with has a clear understanding of your defection in the same period in which you are committing it. After all, you might play with this same person again in another game (or even try to ally with him again later in this same game).

The Zen of Diplomacy

Diplomatic warfare takes as much practice as military strategy or tactics, and the first koran in the "zen of diplomacy" is the Prisoner's Dilemma. The name for this phenomenon was coined in the 1950s by a mathematician who had just seen the opera Tosca. If you know Tosca, you will think of the choices faced by Tosca and the jailer. If you don't know Tosca, here is a Miami Vice version of the same situation.

The Prisoner's Dilemma

❖ ❖ ❖ ❖

One afternoon you find yourself standing beside your late-model BMW facing a small park. On the seat of your car are two briefcases: one contains bags of a white, powdery substance that the Drug Enforcement Agency says is hazardous to your moral well-being—and, thus, is of considerable commercial value. The other contains bags of a white, powdery substance that your mother says is good for you—and, therefore, is of no commercial value at all.

On the far side of the park is a business associate standing beside his late-model Porsche. In his car resides a briefcase filled with dollar bills. Presumably, he has another one filled with last week's newspapers.

Strolling about the park in a leisurely fashion is a member of the city's finest, so neither of you will have the opportunity to do any kind of visual inspection of the briefcases that you are about to transfer.

The associate reaches into his car and pulls out a briefcase. He starts walking for the bench in the park where you will make the hand-off. The time has come . . .

Which briefcase will you take with you?

❖ ❖ ❖ ❖

This is the prisoner's dilemma: a situation where two parties have the choice of *cooperating* and working together or *defecting* and not working together. As a diplomat, your goal is to anticipate and influence when your partner cooperates and when he defects. The most consistent method to assure this control is to show

your partner how your interest and his are mutually served by either cooperating or defecting.

The Kinder, Gentler Ways of Defecting

The no-fault-divorce methods of defecting include the "Go Your Own Way" and the "Draw the Line Here" endings, each of which is fairly peaceful and forgoes any immediate opportunity for a surprise attack. In future games with these same players, these more amicable no-fault endings can pay dividends by establishing you as someone who is reasonably trustworthy.

TREACHEROUS DEFECTIONS, OR STICKING THE KNIFE FANTASTIC

The down-and-dirty-divorce approach means disposing of all diplomatic pretenses and giving your former ally a good thrashing. This method requires using every power at your disposal to launch as cruel a sneak attack on him as possible the moment you're able to do so. Real treachery should lead to the sudden, rapid demise of an opponent, or it should not be attempted. (After all, a victim who is only wounded and not killed may come back after you.)

Those who would prefer the more honorable no-fault approach of defecting will not find much help in reading this section. Conniving, treacherous, back-stabbing weasels, however, will want to hear about some dirty tricks that follow, and are encouraged to read on.

Remembering Pearl Harbor

Since you haven't stopped reading, it is fair to assume that you are (at least potentially) the dastardly type. Good. *Empire Deluxe*, when played with other human players, has some potential for players like you. Pearl Harboring your fellow player is, of course, a technique best employed by those who know that they will remain friends with their victim afterwards—in other words, those who realize that *Empire Deluxe* is, after all, only a game. Those looking to take out any real-life revenge should seek counseling instead of game matches.

The best way to carry out this Pearl Harbor technique is to position your units in favorable combat positions near his cities during your shared period of mutual nonaggression. If you can rationalize your troop positioning as "defensive in nature" or "coming to his support," thus lulling your ally into the proverbial false sense of security, so much the better. Once you are in position, drop the last vestiges of your alliance and roll over his urban landscape. It is that simple.

To achieve greater surprise, make fewer preparations. (*Caution:* Never allow others to do this to you, lest you be vulnerable to this type of treachery.) Don't forget that the goal of such dastardly treachery is the total destruction of the victim. Assassins do not leave their targets wounded, lest they live to hunt the assassin. Never stab someone in the back for a mere city or two. Treachery such as we're describing is an all-or-nothing proposition.

The Moral Justification for Treachery

After ruthlessly stabbing someone (or defecting), whether it is before his eyes, right under his nose ,or behind his back, he'll probably ask the usual victim's plaintiff plea, "Why?" Every victim wants to know "Why me?" "How could you do such a thing?" and so forth. Since you're not really a bad person, after all, Table 13.1 lists some handy answers for those niggling little diplomatic questions that victims so often ask. After you've been caught red-handed, these excuses should, at least, amuse the other players in the game and keep the atmosphere light and up despite your contemptible, treacherous deeds.

TABLE 13.1: THE MORAL JUSTIFICATION CHART

I'm Really Helping You:

"I am only trying to help you gain allies by sympathy."

"That which does not destroy you makes you stronger."

"Suppose I let one of the other players crush you! Do you realize that I just saved you a lifetime of embarrassment from losing to an inferior player?"

"Yeah, I attacked you. Isn't it GREAT? Now THEY think that we're enemies!"

Big Lies:

"I have legitimate territorial claims here."

"I'm liberating your oppressed peoples."

"I didn't want to waste the bullets we issued with your name on them."

"I have no further territorial demands."

"I want to ensure that peace reigns throughout this region."

"Your unit's chemical emissions were destroying the ozone layer."

"My military is no longer under my control."

"You must be seeing things."

"I deny everything. I didn't attack you. YOU attacked ME. Yeah, that's the ticket . . ."

"The commander in charge of that operation has been purged. I'll give you that city back real soon."

The Diplomatic Maneuver:

"This is only temporary."

"Consider it a compliment that someone is paying attention to you."

"I could stop, of course, for a price."

"I'll let you attack me NEXT time. (Wink, wink, nudge, nudge.)"

It Was Fated:

"The omens were favorable."

"Think of this as global Darwinism in action."

"Because you were there."

"Haven't you ever heard of manifest destiny?"

"Summa sedes non capit duos." (The highest seat does not hold two.)

"My horoscope today advised me against long relationships."

"I guess this is becoming a habit."

"C'est la guerre." (Such is war.)

"My actions were mandated by the U.N. —Welcome to the New World Order."

You Might Win:

"This was a preemptive move."

"I believe in doing unto others BEFORE they do unto me."

You Are Winning:

"You're winning. Next stupid question."

"I don't think the winner has the right to ask that question."

It's Your Fault:

"I believe that we have a misunderstanding on YOUR part."

"Your feeble attempts at a diplomatic solution have failed miserably."

"And you BELIEVED me?"

"I'm only responding to your covert hostility."

"You misrepresented your actions as hostile."

"What made you think that I WOULDN'T do that?"

"You shouldn't have given me all that support."

"Why are you moving units so close to my cities?"

"You're so slimy, this is the only way I can really be sure exactly where I stand with you."

In Your Face:

"So sue me."

"Well, what good is power if you don't use it?"

"Don't give me that 'Et tu?' jazz!"

"Look, if I'm so two-faced, would I be wearing THIS one?

"I'm not speaking to you."

"Yo' Mama!"

"Quiet, please, I'm trying to win."

"Was it good for you, too?"

"Hold still, or I might accidentally twist the knife."

"Sucker!"

"Who promised you a rose garden?"

"I admit it, greed got the best of me."

Oh, That?:

"That was just a training exercise."

"That was just a mere border incident."

"That was just a large reconnaissance-in-force."

"That was just my new fund-raising technique."

Oops!:

"Did I forget to mention that you were in my way?"

"Oh, was that YOU I invaded?"

"My dog ate the manual. I didn't know I could do that."

"Temporary insanity."

"I hit the wrong mouse button—twice."

"I'm still learning this game. How do I pull back?"

"I was trying to use the mouse left-handed."

"I must have been drunk at the time."

"I'm color blind. That looked like one of my units."

I'm Taking Revenge:

"This is payback."

We Are Having Technical Difficulties:

"What? I'm having line-noise problems. What you're seeing could be a COM glitch."

"Sorry, these LCD screens are just SOOO hard to read."

"It must be that new computer virus that's going around."

"Um, I think my keyboard jammed."

"What happened? I let my (spouse, child, friend, etc.) take over for a moment while I went to (answer the door, go to the bathroom, get something to drink, etc.)."

He Made Me Do It:

"I was talked into this action by _____" (the victim's best friend).

"The devil made me do it."

"It was either rally them against you or they would rally against me."

"I have to do this on the advice of my attorneys."

"Alan Emrich recommended this in his book."

WHAT TO DO WITH THAT UGLY KNIFE STICKING IN YOUR BACK

Handling a backstab (or a defection crisis) is the ultimate diplomatic test, and there are many choices you can make in reaction to it. The reflexive response is to yell, "Traitor!" and throw everything you have against that slimy so-and-so while your soul is brimming over with righteous indignation and bloodlust. However, this seldom will work out well. Usually, the vendetta reaction only succeeds if the moon is blue and you just won the state lottery so you can buy off all the other players while you commit all your resources to squash that bug of a defector, oblivious to the other threats in the game.

Other choices include turning the other cheek, which is effective if the defector is small and he realizes that you have been protecting him from someone a lot bigger and meaner than you are. The run-for-cover approach is designed to get you out of the way of the defector so that you can conduct a Flavian, or *guerrilla*, defense.

Hopefully, it won't be too long before the defector has trod on the toes of another player, at which point you can switch from a Flavian defense into a "let's you and me get this rat" combined offense by joining the defector's latest victim. Alternately, when you become aware of one player stabbing another, offer to ally with the victim against the aggressor for a big piece of the action (i.e., the lion's share of the rewards for vanquishing him). Victims are ripe for alliances against those who have done them wrong, and are often willing to let their allies have some extra benefits in exchange for the satisfaction of their personal revenge.

Defection is not the end of the world, however. It is merely a reshuffling of the deck. It just means that, in addition to playing hard with your units on the screen, you are going to have to play smart with the people around you.

THE DIPLOMATIC POUCH

Finally, what should you do when another player beseeches you with diplomatic offerings? Well, only your instincts and lessons learned in the diplomatic school of hard knocks can help you there. We will make one observation, however. Generally, the weak want strong allies (to protect them) and the strong want weak allies (whom they need not fear and can dominate). Perhaps such a symbiotic relationship is in your future . . .

SIGNING OFF FROM THE STATE DEPARTMENT

This chapter took a lighthearted look at diplomatic arrangements. Both human- and computer-player relations were examined, but in the end, who can you really trust? *Empire Deluxe*, even when stocked with multiple human players, offers only limited opportunities for diplomatic intercourse, so you must learn to make the most of whatever opportunities are presented (and try to practice "safe diplomacy"). After reading this chapter, if you are not yet swimming with the sharks, hopefully you will have learned enough not to be eaten by them.

Still, the best thing about playing with other humans is the shared gaming experience. Another great thing to share with your fellow Empire-Deluxe enthusiasts is your custom-built scenarios. Not only do you get to let your creative juices run wild, but others can enjoy your efforts as well. Turn the page, Rembrandt, and let the screen be your canvas.

The Scenario-Building Test Laboratory

Just as there is a difference between teaching young people about sex education (read: human plumbing) and sexual relationships (read: love and emotions), so there is in learning about creating scenarios for *Empire Deluxe*. While the game manual was long on plumbing (which we will not repeat in this chapter), it was completely lacking in the love-and-emotion aspects of scenario designing. Therefore, this chapter will focus on the heart, the soul, the passion (or, for the dispassionate scenario designers among you, the philosophy) that makes for enjoyable scenario designs in *Empire Deluxe*.

Once your right brain is stimulated into creativity, you will also find a few things that your left brain will enjoy. Primarily, these are ways to complete your design so that your map contains many interesting and challenging features. Also, a few special nuts-and-bolts features are included in this chapter to supplement the game's documentation. We will occasionally refer to the scenarios we designed for *Empire Deluxe*—as included in the released version of the game (the three tutorials for this book, the three World War II scenarios, the Computer Gaming World Tournament scenario, and Operation Sea Lion) as design philosophy examples.

SCENARIO-DESIGN PHILOSOPHY 101

Every scenario should set out to accomplish something before the creation process begins. You, as the designer, must determine what design goals you want to achieve and keep them clearly in mind as you lay out every landmass and every terrain feature and place every unit. The philosophy of your scenario design is the mental glue that holds it together as you construct it. It also gives you a yardstick by which you can measure your

design's success or failure once it is completed.

To focus on a clear design philosophy from the outset, we give you some questions you should be asking yourself. The answers will define the scenario's purpose and give you a goal to achieve when designing it.

"Who Will Play This Scenario?"

How many players is it intended for, and how many of them must be human?

For example, the Sea Lion scenario is designed strictly for two human players. This is because of the weaknesses in the artificial intelligence in dealing with large landmasses, economic build up, and the need for some extraordinarily cunning in maneuvers and combat tactics—all key elements in the game's design philosophy. When this scenario was conceived, the decision was made to make it a grand test of *Empire Deluxe* skills for two serious human players. Each faces his or her own dilemma; also, the situation covers one of history's greatest "what ifs."

"How Long Should This Scenario Be?"

The answer to this question will affect the size of the map and can influence the special rules included with your scenario design. The size of the map has a major effect on game length. If the goal remains, simply, world conquest, your experience will have shown you that larger maps geometrically increase the amount of time needed to conquer them. Not all scenarios, to be challenging, require the largest map size available. Philosophically, for example, the World War II scenarios were to be epics played out on a large map of the earth. Conversely, the first two tutorial scenarios are quick-playing designs build on the smallest maps possible.

Another element that can influence game length is simply imposing one in your *special rules*. For example, the German player must win the Sea Lion scenario by turn 200, or he loses. Similarly, the Computer Gaming World Tournament scenario ends, at the latest, on turn 200, or immediately after one player controls all three starting cities. These are special rules that must be enforced by the human players involved.

"Will This Be a Historical Scenario?"

If so, you will want to do some research. An atlas will help with the terrain, of course. A listing of the military units that fought (called the *order of battle*) can be harder to find, but if the subject you've picked is also the subject of a board wargame, its pieces should be easily translatable into *Empire Deluxe* units. Designing historical scenarios can be challenging, but it is equally rewarding when you have finished them.

"Or Will I Need to Be Really Creative?"

Whenever you're creating the map and unit set up (if any) from your imagination, this should inspire more questions. Without a historical situation to recreate, you must really focus on what you're trying to achieve. Beyond your answers to the previous design-philosophy questions, consider some of these questions (discussed in detail below):

- Will this be a borrowed or original map design?
- What size map shall it be?
- Will there be many or few landmasses, and what will their sizes be?
- What special terrain features, if any, will influence play?

- How will I paint the *economic landscape*?
- Where are players going to start?
- How strong will their initial forces be?

"How Will This Scenario Be Won?"

What other special rules, if any, should I impose?

This is where you can really define your scenario beyond the standards imposed by *Empire Deluxe*'s inherent design of "discover and conquer the world from scratch." Having variations of the sighting rules to choose from (nothing visible, all visible, or map only visible at all times) and defining what unit types are available during the game give the scenario designer a lot of power.

You can also artificially impose the game level played (i.e., require using the Advanced Game rules for your scenario) and what difficulty level the computer players must be (usually experts). Furthermore, you can even specify which players should have what degree of handicaps as part of your scenario's grand design-scheme.

MAP DESIGN: SETTING THE DIMENSIONS

The map will greatly affect the scenario being played. With so many variables ranging from its size to what you draw on it, it is crucial to have well-thought-out maps. As many have discovered, their enjoyment of a particular game of *Empire Deluxe* directly relates to how interesting the map was. Therefore, when creating original maps (i.e., ones not translated from an atlas), keep in mind the types of terrain formations that you found interesting, and try to include similar ones in your design.

Map Size

Generally, nothing defines the average length of a game of *Empire Deluxe* more than the map size. That is because a normal game requires a single player to spread out across the entire map and conquer it. Usually, the map size also corresponds to the amount of time it will take you to design a scenario. As with game length, there is a geometric progression of the playing time involved as the height or width of the map increases.

You initially define the map dimensions as you begin to create a scenario. The height can range anywhere from 20 to 150 squares, while width may vary from 20 to 200 squares. This can create maps as small as 400 total squares or as large as 30,000. (As a basis for comparison, old *Empire* maps were 60 x 100, or 6,000 total squares—see Table 5.1.)

Besides affecting game length, map size can also affect game play. The larger a player's borders become, the more units must be detached for securing them. This means more air and sea patrols. The size of the oceans, and the distances between landmasses and air bases, also has a direct effect on the viability of using aircraft carriers in a direct combat-support role. Remember, units move slowly on the *Empire Deluxe* map (generally a square or two per turn). Therefore, long maps will take players an equally long time just to shift their forces around on it.

Map Wrapping

Remember, if a map wraps, units moving off the eastern edge continue from the western edge, and vice versa. In other words, the world is cylinder-shaped, with an impassable border along the top and bottom map edges. When the wrap feature is toggled off, the corners of the map are safe havens for players to hide in since

there will be solid eastern and western map edges that enemies cannot cross.

Playing on a map with the wrap feature on creates a far more dangerous environment, and is, therefore, much more challenging. The safest position on a wrapping map is to secure as much of either the northern or southern map edge as possible and then expand out in a triangle shape with the secure map edge as your base.

Deciding whether to have the map wrap will have a major impact on the ease of early exploration. It will also influence the difficulty of security later in the game. Consider this carefully when designing your scenario.

Changing Your Mind About Map Size and Wrapping

You are not locked into the parameters that are initially loaded when you began working in the game editor. Select Map and then Resize from the Menu bar (or simply press Alt R inside the game editor). A control box pops up allowing you to resize the map or change its wrapping status.

Note that reducing the size of a map will remove the rows and columns with the highest grid-coordinate numbers. In other words, it erases rows along the bottom of your map and columns along the right side. Use caution, therefore, when decreasing the size of your map. You might be erasing a part of the map you want to keep! Conversely, increasing the map size adds rows of and columns of ocean squares to the bottom and right edges of your map.

When the wrap feature is added to a previously nonwrapping world, the eastern/western edge rows are superimposed on both the first (0,#) and last column of the map (see the section below on using grid coordinates). Those two columns will have whatever terrain that used to be on them wiped out and replaced with the crisscross pattern of the map edges. This devastation is permanent and, if you later change your mind and want the world to wrap again, only two columns of ocean squares will remain where once you may have had other terrain. If you want it replaced, you'll have to draw it back in from memory.

MAP DESIGN: NOT STARTING FROM SCRATCH

There is no rule that says every map you create has to be entirely original. In fact, many first-time scenario designers get "artist's block" when they stare at the blank map section of the scenario editing screen. It is very common for a scenario designer simply not to know where to begin when creating a map. Fortunately, *Empire Deluxe*'s scenario editor has made this problem fairly easy to overcome.

Randomly Generated Maps

First, from the Map menu of the scenario editor's Menu bar, you can always select Build World. That will fill your preselected map size with a typical, randomly generated *Empire Deluxe* world. If you don't like the look of it, replace it by rolling up another one until you find one that has the core map elements you're looking for. This will give you a good starting point for your map design that you can modify to suit your exact needs.

Previously Saved Maps and Scenarios

Another way of instantly putting a map on the canvas is to find one you liked while playing the game and had the foresight to save the map separately. For example, let's say that you want to

design a scenario featuring the entire planet Earth. Well, since we already provided you with a map of the planet in the World War II scenarios, all you have to do is load one up and select Save. Just be sure not to save the game, but instead save just the map. After you give it a name, exit the scenario, re-enter the Game Editor, and either select that map to start with or, from the File menu, select Load and then Map, as shown in Figure 14.1. Any time you're playing a scenario on a particularly interesting map, save it separately. It might inspire you to design a brilliant scenario around it.

For the record, this is also a handy tool for those who like to cheat. By separately saving the map to a world that is undiscovered, you can call it up in the game editor and examine it. If you're really determined to cheat, save the *scenario*, and, when you examine it in the game editor, you will see not only the map, but also each player's units and cities. However, playing by e-mail disables the save-map and save-scenario features so that you cannot so easily cheat others. This will only work when you are, primarily, trying to cheat yourself.

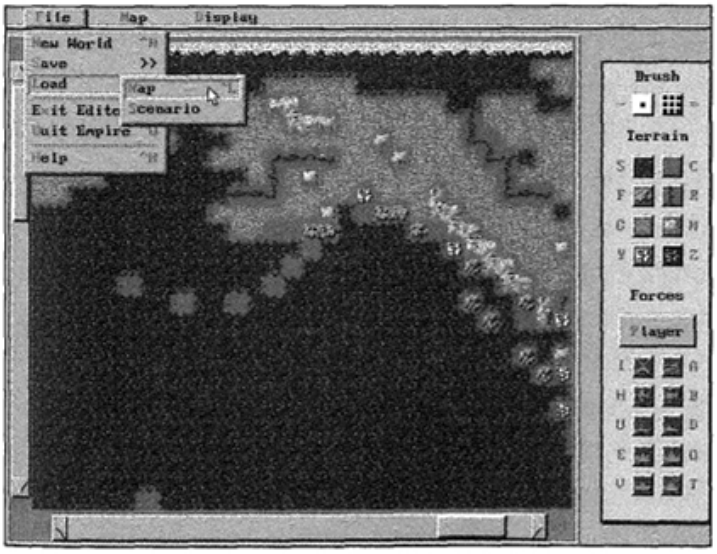


Figure 14.1 Selecting a previously saved map as your starting point

What *Empire Deluxe* does when converting old *Empire* maps is to recognize that they are old *Empire* maps and read them in. If you want to convert them, you just load them into the *Empire Deluxe* map editor and then resave them.

—Mark Baldwin

Players can also import maps saved from the old *Empire* game. Once loaded into the *Empire Deluxe* game editor and saved, they become playable *Empire Deluxe* maps. Unfortunately, because of a bug discovered in the IBM 2.xx versions of the old Empire game, some maps might not load for owners of the IBM 3.0 version of *Empire Deluxe*. A "fix" program called FIXEMA.EXE is available on both GEnie and CompuServe, directly from New World Computing (their customer service number is (818) 999-0607) or by asking other *Empire Deluxe* owners. This has also been addressed in the IBM version 3.10 *Empire Deluxe* upgrade (see Chapter 16).

Translating a Map from an Atlas

Finally, another way to make sure that you're not simply drawing on a blank canvas is to use an atlas and simply try to paint the map you see. Of course, you should work out in your mind some sort of scale when you begin ("Let's see, I want France to be about 12 squares across. . . .") and then try to work things out proportionally.

Begin by drawing the outline of a chosen spot. Next, fill it in with clear terrain and then place the important rivers on it. After that, dot it with appropriate cities, and then, finally, place the forests and mountains. Don't be surprised if your map doesn't look right after it is initially drawn from an atlas. It will probably take a bit of fudging before it really starts to work. In the

heat of battle, however, *Empire Deluxe* players will easily overlook any minor quibbles they may have about your map translation. So, do your best when interpreting maps for the game, but don't frustrate yourself trying to get it perfect.

Using Grid Coordinates

There is one undocumented mapmaking tool that you will find particularly useful when trying to translate a map from an atlas. It is the grid-coordinate numbers located on the Information bar along the top of the screen. If you have no brushes selected (i.e., you are not ready to paint any new terrain feature), then you are in information mode. In this mode, clicking either mouse button will show you both the terrain type and the grid coordinate for that square, as shown in Figure 14.2.

Each grid coordinate consists of two numbers separated by a comma. The first number is the location's horizontal position on the map, which increases as the cursor moves to the right (eastward). The second number is the vertical position on the map, which increases as the cursor moves toward the bottom (southward). Map coordinates always begin in the top-left (northwest) corner at (0,0). This square is always an unplayable border square. If you are looking for square (0,0) on a map that wraps, you may have to click along the top edge a few times to find the map's actual *wrapping point* (i.e., horizontal coordinate), but it will coincide with the place where the lower-scroll-bar button jumps from one side to the other.

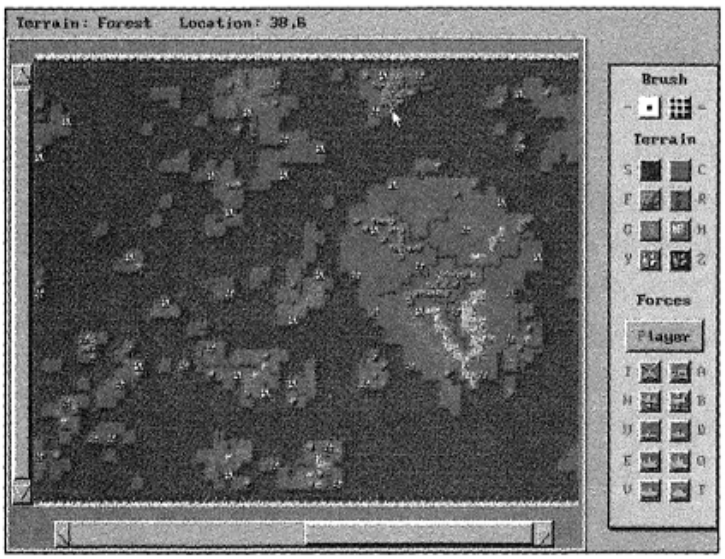


Figure 14.2 The Computer Gaming World Tournament scenario is under the designer's surgeon scalpel. Notice that where the cursor is pointing, after a quick click of the mouse while no brushes are selected, the terrain type and grid-coordinate numbers appear on the Information bar along the top.

Using grid coordinate numbers when you design a map will help you to place strategic terrain enough squares apart to affect air operations. For example, you might place two cities across an ocean so that air units cannot simply fly across the ocean and rebase, but instead, players must build carriers or air bases to operate airplanes between the cities. You can also place cities so that they are 13 squares apart, keeping bombers from striking them and returning home without refuelling.

MAP DESIGN: THE GEOGRAPHIC LANDSCAPE

With the issues of map size and starting points decided, it is time to start filling in all of those empty squares staring at you from the game-editor screen. What are you going to put in them? If you didn't start your new map from scratch or use an atlas, you already know, and it's just a matter of getting it adjusted the way you like it. When you're staring at a blank slate, however, what do you do? Quite simply, you fill it in with interesting terrain features such as the ones discussed next.

Landmasses

While it is enjoyable to dot a map with many small islands, larger continents make the most interesting terrain features. Since they take longer to explore and capture, and they usually possess several cities, larger continents tend to become highly embattled focal points of a good game of *Empire Deluxe*. Although games will take longer when larger continents dominate the map (because of the longer time it takes to conquer them), they do add spice to old-fashioned island-hopping scenarios.

Having a good variety of landmass sizes and locations is often the best way to go. However, if you have a theme for your world in mind, use that instead. Perhaps you want a world with only one-square islands or one that is solid land—if so, then build it! Only when you've created such worlds and tried them out will you know if they are fun to play on or not.

Strategic Island Bases

When you design a world with vast oceans, consider dotting them with strategic island bases. If any of these are clear-terrain squares, then land units can build air bases on them. If any are island-city squares, then those will become major focal points during transoceanic operations. If you choose to have no such bases amid vast oceans, you will be considerably increasing the importance of aircraft carriers.

Smooth Versus Difficult Landscapes

When deciding what type of terrain will be placed where on a landmass, ask yourself if you want it to be easy or difficult for armor to traverse. While difficult terrain (particularly mountain ranges) will create some interesting strategic problems, it also reduces player enjoyment if it dominates the landscape. The exception would be if that is your world's theme—such as a jungle planet or a desert planet, etc. If you have planned other interesting things for players to experience around the dominant terrain type, then a slow-terrain planet could still be enjoyable to play on.

Since there are no roads in *Empire Deluxe*, it is interesting to cut through patches of difficult terrain with a path of clear-terrain squares for armor units to move through. This is particularly useful through mountain ranges that are otherwise impassable to tanks. Although it does tend to channel the tank's movement, at least they can get through. If you want armor to get through a mountain range but not as quickly, run a river pass through it instead, as shown in Figure 14.3. Rivers aren't friendly places for armor to attack, but the tanks can at least slog through them if they want.

Strategic Interaction Points

As explained in Chapter 9, confluence points on the map where landmasses and oceans connect are important strategic terrain features. Diagonal

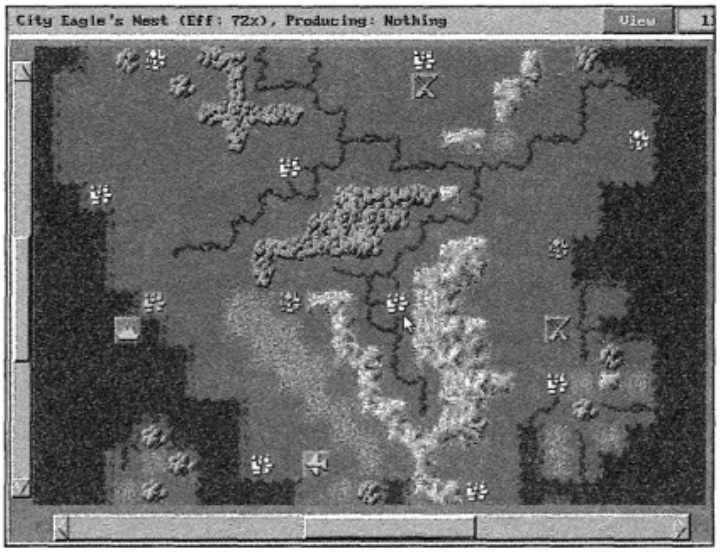


Figure 14.3 Through difficult terrain you can make artificial roads or run rivers so that armor can quickly pass through it.

connections where land as well as sea units can pass through and the more restricted *canals* both have their places in an interesting and enjoyable map design. Also important is the placement of ports, particularly *canal ports*, as strategic interaction points. Remember, joining larger landmasses and oceans at a nexus makes controlling it more crucial during play.

Computer AI Considerations When Mapmaking

If you have examined the Earth map in *Empire Deluxe* closely, you may have noticed that the Panama Canal is just an ocean square and that North and South America are not joined by way of the Panama isthmus. The designers did this in response to a feature of the computer players, or *Artificial Opponents* (AOs). The AOs will primarily concentrate their production on securing an entire landmass before gearing up to move off it. Thus, when these two continents were connected, an Allied computer player would always spend many turns conquering South America and, to do so, building up a huge, lumbering land force (and no navy). Because of this, a computer player would be playing the Americans quite ahistorically. A satisfactory solution to this problem was the simple expedient of severing North from South America.

Therefore, when designing a scenario map where you plan to have computer players competing, be careful not to connect all the landmasses, or the AOs will build few, if any, ships. Also, remember that even when computer opponents do need ships, they will never build enough transports to conduct coordinated, large-scale invasions. Don't plan a map around this theme if computer players are going to be the primary participants. Making large-scale invasions and plenty of transport ships are two things that the AOs simply will not do.

Finally, computer players are used to "knowing" that there is a port on every landmass (as there always are when the computer randomly generates a map). If you create landmasses without ports, that, too, will hinder an AO's ability to play a decent game. The net effect will be to further reduce a computer player's naval production and slow his ability to transport tanks and armies off that landmass.

MAP DESIGN: THE ECONOMIC LANDSCAPE

When we speak of the *economic landscape* of a world, we're talking about cities—not only how many will be placed on the map (up to a maximum of 200), but also where and with what production efficiencies and specialties. Chapter 5 explained how the computer generates the economic landscape on a randomly generated world, but you are not so restricted in your designs. Consider the points discussed next.

City Density

Cities can be more widely dispersed or clustered together in tight knots than they are on the randomly generated maps most players are used to. Multiple cities right next to each other can make for some interesting starting capital-city locations. When cities are more widely separated, air bases and carriers will become a more influential factor in the game.

Production Efficiencies and Specialties

When pondering the production efficiencies and specialties of the cities you place on the map, remember that you are trying to influence *future*

The minimum city production efficiency is 1 percent, not 0 percent as stated in the manual on page 91.

production throughout the scenario (as opposed to any starting setup of units). Beginning with many cities with terrible production efficiencies (such as in the Sea Lion scenario) makes a player's starting units extremely important. It can also mean a long game if world domination is the goal!

Limits on Improving the Global Economy During Game Play

We explained another weakness of the computer's AI in Chapter 10. There you learned that, when building up a low-efficiency city, computer players do not play the *long game*. In other words, they will only keep a city off-line until its efficiency is somewhere between 20 percent and 50 percent. Seldom will they try to improve it beyond the 50-percent level (at that point, further raising of the city's production efficiency level drops from a high to a low priority). Similarly, most human players won't bother trying to raise a city's production efficiency much past 104 percent because of the diminishing return in efficiency for the time invested to raise it.

Therefore, high-production-efficiency cities must be placed by you, the designer, when you create the map. If not, the game will probably never develop any of these super cities. Now, if a poor world is your plan, then that is fine. In practical, *Empire Deluxe* game playing terms, however, a rich world can be played into a poor one, but a poor world's economy will only rise, at best, to mediocre.

MAP VISIBILITY

The final decision about scenario-design map-making is what visibility level you should set for it. At the time you save your scenario, you decide the scenario's Exploration Rules, as shown in Figure 14.4. You can either have a fully visible map or a map that will be blacked out and must be discovered. Since scenarios must use the one map that is created for them, if played more than once (or played by the scenario's designer), the map-discovery element quickly loses its novelty. Much as happened in Chapter 11, when replaying a discovery scenario that has been previously experienced, any player's memories of the map translate directly into advantages.

Therefore, for most of your scenario designs, choose an option where all of the terrain is fully visible. This will keep all of the players on a fair footing throughout the game. About whether the land units, too, should be visible, that is a question we'll consider later in this chapter.

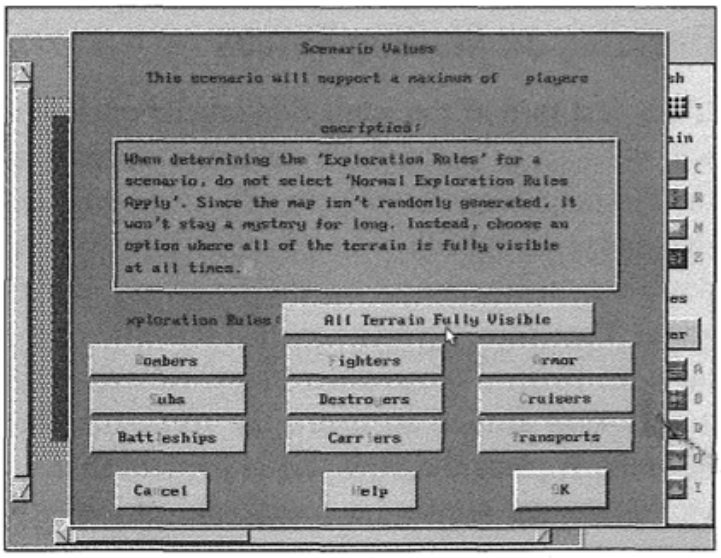


Figure 14.4 Some good advice

THE PHILOSOPHY OF STARTING FORCES

A traditional game of *Empire Deluxe* begins with no starting forces. Scenarios, however, can be anything their designers want them to be. For example, the World War II and Sea Lion scenarios both start with players' forces already dominating the map. In fact, some players begin with so many units (such as the Japanese in the World War II scenarios) that they are actually a drag on their overall economy right from the start (see Chapter 10). The Computer Gaming World Tournament scenario, on the other hand, features expansion out from a single city, but includes a few starting forces for each player to get things moving along quickly.

Therefore, you must decide what the initial military situation is going to look like. How strong will each player's forces be? Where will they be located? Is this going to overlap with the economic landscape (i.e., will players begin with more than one city)? Players' starting forces are a key element when blended with other scenario-design considerations to create balanced, exciting situations.

Computer AI Considerations When Deciding on Starting Forces

If the first turn of the game is a crucial one, you will want to help computer players out. Here is the reason: Computer players will move units in the order in which you placed them when designing the scenario on the first turn of the game. Therefore, if you know that it would obviously be better if a computer player sailed out of a port with armies on board the transport you have there, place the transport in the city first. If you don't, the armies may walk out of the city on the first turn before the transport takes its turn to move. Also, you will want the computer player to move its fighters first, instead of its bombers, over an initially contested area.

When we designed the Computer Gaming World Tournament scenario, each player's starting city had its main-island land units placed there first, then their transport, and then their transport's cargo infantry units last. In that way, the computer players will, on the first turn, move some of their land units across the mainland while sending all of the other out to sea on the transport. Thus, we have forced them into making a balanced move on the first turn of the game. Observe three computer players playing it, and you'll see what we mean.

THE PHILOSOPHY OF SPECIAL RULES

Special rules can greatly define your scenario and restate its design philosophy. Many things may make up a scenario's special rules. Of these, some are decided when the scenario is saved. Those and other special rules are discussed next.

Unit Visibility

Generally, a game of *Empire Deluxe* is more interesting if the pieces are unrevealed until sighted according to the normal rules (see Chapter 7). However, you may want a more boardgame-like feel to your scenario design, in which case you should have your scenario played with the pieces always revealed. (If you don't like this, you can always take the scenario back into the game editor and resave it the other way.)

For example, many *Empire Deluxe* players enjoy the Milton Bradley boardgame *Axis and Allies*. The World War II scenarios in *Empire Deluxe* were, admittedly, inspired by that popular boardgame. However, the scenario is current-

ly set so that the units are not visible until sighted. If you want to play these scenarios so that they are more true to this boardgame, simply resave them with the unit visibility on.

Unit-Production Availability

Another restriction that you, as the scenario designer, can create is to restrict what types of units can be built during the game. Your choice of prohibited unit production does not have to be at all congruous with the initial set up of units, as shown in Figure 14.5. For example, you can start each player with a few transports and then set the toggle so that no more can ever be built. (Watch how well-guarded transports are under those circumstances!)

An important note here also concerns using the Standard Game rules. If the Standard Game rules are selected, any Advanced Game pieces initially deployed on the map convert to their Standard Game counterparts (tanks and air bases to infantry, bombers to fighters). If a stack of planes were on an air base, they'll begin the game flying over the infantry unit in that square with no fuel expended.

If you want to prohibit fighter production under the Standard Game rules, you must select No Fighters and No Bombers by clicking on them or typing the appropriate letter. (If one or the other is allowed, fighter production will be allowed). Similarly, to prohibit army production, No Infantry and No Srmor production must be set.

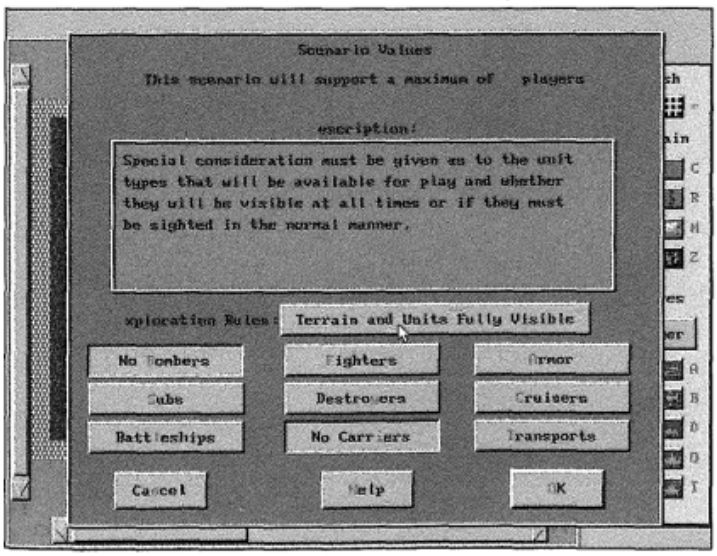


Figure 14.5 The unit availability selection

Imposed Conditions

There are also other conditions that you can impose on players of your scenario design. For instance, you should let them know if the design was for play under the Standard or Advanced Game rules. Most players will probably use the Advanced Game rules unless specifically told to play using the Standard Game rules—so be sure to mention this in the scenario's narrative text.

You will also be imposing the game settings you saved the game under. For instance, if your control panel is set to No Sounds and No Production reports, that will be every player's default setting at the beginning of the scenario. They can change these settings, but you will define them initially.

You can impose other *human-agreement* conditions as well. These require the cooperation of the human players involved because they are an aberration of the normal *Empire Deluxe* rules of play. A few examples include the following:

- An artificial time limit.
- Victory conditions other than complete global conquest.
- Imposed player combat and/or production handicaps.
- Imposed alliances or teammate status with other players.

For example, on CompuServe, Randy Rye (72370,2754) posted a bulletin saying that he and his brother like to start their games with no neutral cities at all. They take turns converting

them to their respective colors in the editor. Afterwards, they each secretly place a thousand turns' worth of production inside their cities before starting the game (which gets it off to a quick and exciting start).

Of course, it is important to clearly explain these human-agreement conditions in whatever text is used to supplement the scenario. Although they count on the cooperative good spirit of the players, using these types of artificial conditions on a scenario of *Empire Deluxe* can add a great deal to it. Look at the Computer Gaming World Tournament rules for some good examples of these types of artificial rules (see the section "CGWTOURN.SCN" later in this chapter).

Introductory and Supplemental Text

The Scenario Values screen allows you to type in a brief introductory description of your scenario that others will see as they load it. Choose your words carefully, particularly if you have to explain any human-agreement conditions. If you need more room, refer people to a supplemental SCENNAME.TXT file (where SCENNAME is the name of that game file), which you must create to go with the scenario. In that text file, carefully explain all of the outside game conditions you need to impose so that others will play the scenario as you intended when you designed it.

For example, on the following page is a cleaned-up version of the supplemental text for the Computer Gaming World Tournament scenario. Notice how it defines the game settings and includes many imposed conditions.

MODIFYING SCENARIOS TO SUIT

In *Empire Deluxe*, no scenario is written in stone. Instead, they're written in bits and bytes, and you can easily modify them. Just call one up in the game editor, and tweak it all you like.

For example, by now you have played the third tutorial scenario at least twice (in Chapters 4 and 11). Since the two continents on the map are so far away from each other, it might be interesting to add a city somewhere in between. Not only would this city be a permanent air base, but also an important repair facility for the player seizing the initiative.

Let us create, on the middle island in the chain, the city of WALTERVILLE, as shown in Figure 14.6. Adjust its values so that it begins the game with only a 50-percent production efficiency and specializes in submarine production. Now, that ought to make things more lively around the center of the map!

Now, save this new scenario. On the Scenario Values screen, change the sighting rules so that the map (only) is visible. That way, the computer player won't be at a disadvantage playing against you (since you will remember where things are while the computer player forgets and has to rediscover everything from scratch each time it plays). Finally, replace the text with the text shown in Figure 14.7.

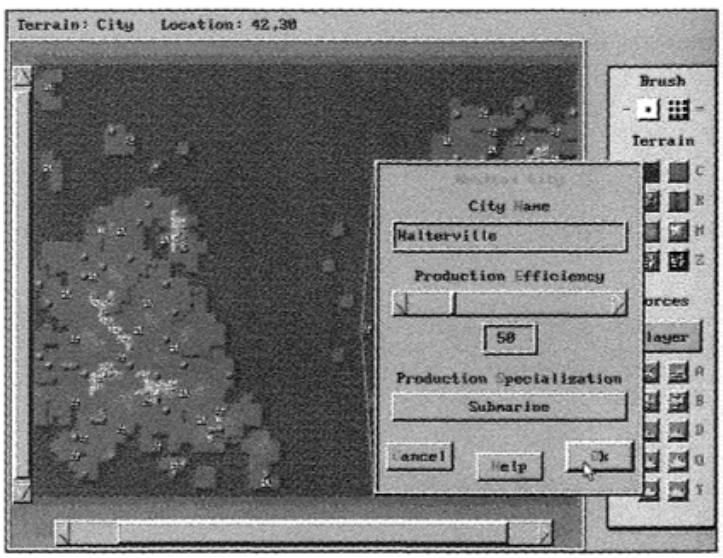


Figure 14.6 Adding WALTERVILLE

CGWTOURN.SCN

This is the official Computer Gaming World / New World Computing Tournament scenario, designed by Alan Emrich. It is a tight little three-sided contest fought between two human and one expert computer player. The tournament rules are as follows:

1. Before beginning the game, the two human players should decide which player number (i.e., color) they will be and which position will be computer-controlled.
2. Play using the Advanced Game Rules.
3. When you reach the Player Setup screen, give the computer player Moderate handicaps for both combat and production. Assign each human player three levels of handicaps. These can be taken either as one level of handicap (Slight) in one category and two levels (Moderate) in the other or as no handicap in one category and three levels (Average) in the other—it is up to each player individually.
4. The scenario ends immediately when one of the two human players controls all three "capitals" (player starting cities), with the controlling player immediately declared the winner. Alternately, if one human player remains after the other has resigned, the sole remaining human player wins. If neither of these victory criteria has been met by the end of turn 200, the game ends and points are counted with the higher score deciding the winner.

Each human player scores one point per point of production efficiency in every city he or she controls. No points are scored for units on the map at the end of the game. Ties are won by the lowest player number (i.e., red is Player 1 and would win in a tie score situation).

Even when not playing in a tournament situation, this scenario is an excellent two-to-three human player game to play by modem. Its quick, intense, and decisive play-balance dynamics were carefully designed and play-tested. We hope you and your friends will enjoy your own tournaments featuring this scenario.

Select OK and get ready to choose a filename. Figure 14.8 shows our suggested filename for this newly modified scenario as TUT3VAR1.SCN. This means "Tutorial Scenario 3, Variant 1." You might also remember it by naming it TUT3WALT.SCN for "Tutorial Scenario 3, with WALTERVILLE." In any case, give it a filename you'll remember, and then watch what a difference it makes to play this scenario again. It won't be so easy since the computer player will know where to go, and the fighting around the new city of WALTERVILLE will be wonderfully fierce. Good luck achieving a decisive superiority now!

PLAYTESTING YOUR SCENARIOS

After you have designed your new *Empire Deluxe* scenario, you are only halfway finished. Now begins the process of play-testing and balancing your scenario. The purpose of play-test-

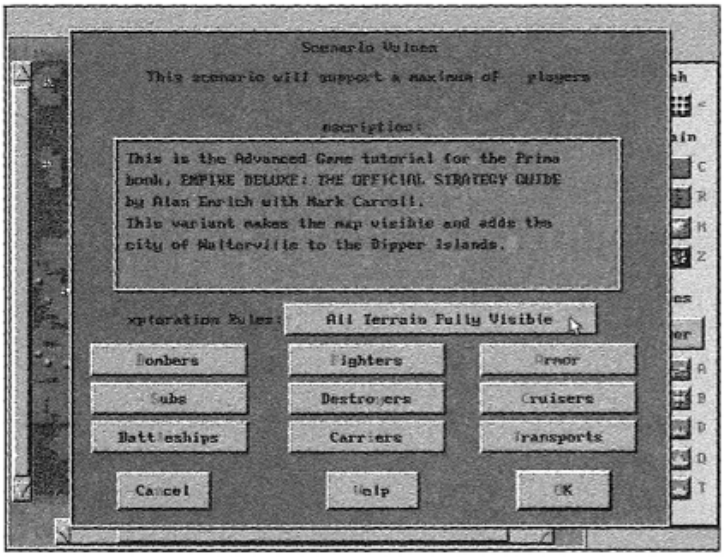


Figure 14.7 Defining this new scenario

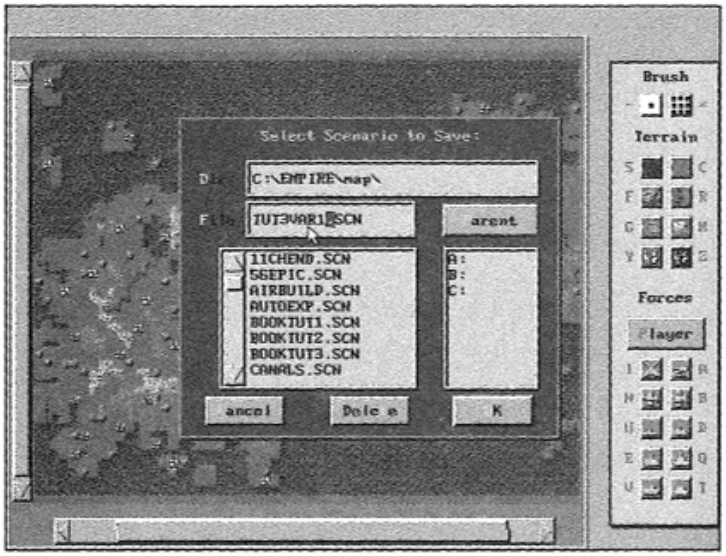


Figure 14.8 Selecting a filename for it

ing is to find if the game is true to your design goals or not—*and* fun to play. Ask questions such as these:

- If you created an historical scenario, does it bear enough resemblance to history and have enough of the right feel to it to satisfy you (and, hopefully, others)?
- Does the game move at the right speed? At about what point will players make their first contact with each other?
- Should any players have forced handicaps? Perhaps the production efficiencies of their nearby cities should be adjusted?
- Are the computer players getting off to good starts?
- If two (or more) humans are supposed to play this scenario by modem, is it short enough to keep their phone bills low?

Play-testing Tips

The beginning game is crucial for computer players. If they get off to a bad start, they will probably never recover before they have to lock horns with a human player. Therefore, the best play-testing you can do is to simply run the game with all computer players and just observe their play, paying particular attention to their early moves. Once you observe a change you should make, re-enter the game editor, make the change, and play-test the scenario again. Repeat this several times until you are finally satisfied that the results are consistently favorable.

If computer players move their starting forces in the wrong order, that means that you placed them in the wrong order. If they don't expand properly, bait them with easier access or closer cities in the direction you want them to go first. You must get computer players off on the right foot in your scenario design.

Of course, if your scenario is not designed for any computer players, then it will be harder to play-test. Although observing the AO play such scenarios might help you to adjust it, only when you play all the positions yourself or get the required number of human volunteers to test out your new design can you really call it play-testing. Make a few phone calls and try to arrange a game. Be sure to get reactions from the other players and consider all of their suggestions

for improving the scenario. If you agree with any of their comments and they work within your design philosophy, carry out those changes.

DID REMBRANDT START THIS WAY?

As you have learned, there is a lot more to making good scenarios then just knowing what the keystrokes are for laying out the terrain and units. The art of game design is one of philosophy. Yes, there will be a lot of time sweating over the keyboard and mouse, placing this terrain here and renaming that city there. Playtesting will add even more time and effort to your scenario design burden. However, underlying the entire process will be your scenario's design philosophy. Keep sight of it, and you will have scenarios that are far more interesting and enjoyable to share with your friends.

From this point forward, we will cease to parallel the *Empire Deluxe* game manual in any way. The next chapter, for instance, focuses entirely on the game's artificial intelligence and artificial opponent. Following that, in the last chapter, is all of the miscellany we found for *Empire Deluxe* that didn't neatly fit in any other chapters. These two chapters are full of fascinating tidbits that you will read about only in this book, so consider this classified knowledge and only share it with an opponent at your own peril!

Examining *Empire Deluxe*'s Artificial Intelligence

We have often discussed what the computer programming does in certain situations throughout this book. This refers to the game's *artificial intelligence* (*AI*). The AI includes routines for automated exploration movement and other elements that affect both human and computer players equally.

When discussing the programming logic used by a computer player, it is called the *artificial opponent*, or *AO*. The AO represents specific computer-player–decision thought processes. These include, for example, what units to build, whom to attack, where, and with what forces. In either case, knowing what you are working with (in terms of the AI) or fighting against (in terms of the AO) is useful information.

This chapter is a compilation of all the clues we have gathered about the AI and AO programming routines in *Empire Deluxe*. Much of it was mentioned in previous chapters. However, some of it is new information, and all of it has been reorganized for ease of reference.

Note that these insights into the programming behind *Empire Deluxe* are simply the authors' observations. Designers Mark Baldwin and Bob Rakosky have perused this chapter to ensure the basic veracity of our claims. To everyone who plays *Empire Deluxe* solitaire and seeks to know their enemy, we dedicate this chapter to you.

A NOTE ABOUT CHEATING

I strongly believe in not allowing the computer AO to cheat, but not because it is *wrong* or *lazy* of the programmer. The purpose of a good game design is to entertain the game player. If the computer can cheat

and entertain the game players, there is nothing wrong. Unfortunately, *cheating*, when noticed, does not entertain the game player—it *frustrates* the game player (for example, the computer can do/know things that I cannot). I don't believe it is possible to *cheat* effectively and not let the game player know it's happening. As such, computer player *cheating* defeats the basic goal of game design (to entertain the game player) and, therefore, should not be done."

—Mark Baldwin

Computer players don't cheat in *Empire Deluxe*; only human players do. Since you are among the latter, you should be aware that some people consider reading this chapter akin to cheating. It is not.

Knowing the information in this chapter will help you fight against computer opponents. By analyzing their playing style and limitations, you have a better chance of defeating them. However, this will only help you to defeat *computer* opponents. If repeated solitaire play causes you to develop reflexive habits for fighting them, beware of the first human opponent you play. An opponent who notices that you are using anti–computer-player tactics can turn that information into an advantage by simply playing an uncomputer-playerlike game!

Therefore, this look at the AI and AO in *Empire Deluxe* is not a piece of the Holy Grail of ultimate victory under all circumstances. It is just another tool in the toolbox that you can use toward winning more games on average.

MOVEMENT

The Explore command is not a Random Patrol command [the "move in a random direction on each turn" order from the old *Empire* game]. Those were two different things, and there currently is no Random Patrol command available. However, you can set up multileg patrols. Random Patrol does sound useful, though. I'm going to add it to the "future consideration" list.

—Bob Rakosky

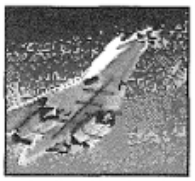
Computer players are restless when it comes to movement. You will never see them leave sentries, for instance. Instead, unless repairing themselves, units seem to move just for the sake of moving. It is very similar in effect to the Random Patrol order from the old *Empire* game.

As you learned in the previous chapter on scenario design, computer players will move their units in the order that you placed them on the first turn of the game. Do not extrapolate this to mean that computer players will not use the wait or skip commands when coordinating their moves. Computer players can and do coordinate the occasional tricky moves that come up (around narrow passages, for instance). However, like most human players, they will tend to move their pieces in the random order in which they come up.

MAP DISCOVERY AND SIGHTING ENEMY UNITS

When discovering the map and sighting enemy units, it will surprise no one to learn that computer players rely heavily on the Auto Explore algorithms, described in Chapter 7. After all, they were invented for the computer players first. The designers included it as a specific movement option when they agreed that human players might also benefit from having the mundane tasks of exploration automated. Therefore, the strengths and weaknesses of automatic exploring are the AO's strengths and weaknesses as well.

Consequently, the computer is not always as methodical as human players are in exploring. Humans will seldom fail to completely explore their rear areas in search of every easy-to-grab neutral city they can find. Humans are also far more aggressive about quickly exploring the corners and map edges in search of safe havens, free of enemy units.



Computer players tend to greatly curtail their exploring operations once they focus on an enemy and go to war with him. However, they don't regularly use their airplanes to update their sighting information and keep current about enemy troop movements and city production. Instead, they simply shift most of their planes over to the war zone to die in combat. With so much world to explore and so many enemy units to keep track of, this is a terrible waste of airplane resources.

To the extent that the AO likes to build carriers, it seldom seems to stock them well with fighters. This greatly reduces the AO's general effectiveness for distant exploration. If you play a probing-style game against computer players, chances are that you can learn more about them than they will learn about you. Knowledge is power, so use it.

Finally, computer players are used to knowing that there'll be a port on every landmass (as there always is when the computer randomly generates a map). If you create landmasses without ports, that, too, will hinder the AO's ability to play. The net effect will be to further reduce a computer player's naval production and slow his ability to transport tanks and armies off that landmass.

STRATEGY

How is the AO as strategist? Comparing the skills used by computer players to the ideals presented in the principles of war found in Chapter 8 will yield the answers.

While many variables are used to determine a computer player's immediate objective (not the least of which is hate for a particular enemy), there is one objective that the AO constantly strives for. Computer players give priority to clearing off an entire continent before they worry much about moving off it. This means that they will build land units there, almost exclusively, until every reachable area on that landmass is subdued by, primarily, overland conquest. Only after making a great buildup of land units on that continent will the AO seriously shift gears into naval and air unit construction.

In terms of other objective priorities, computer players seem far less discriminating. They seem to always want the *nearest* city (as opposed to the best city close by). When they can't decide whom they hate most, they may launch small attacks in all directions.

Finally, the computer players seem stubbornly fatalistic once they set their sights on invading somewhere. If they are repulsed when invading an island, you can count on them coming back. Often they will attack that same island, repeatedly (usually with steadily increasing numbers of units in the attack), until they finally conquer it. The antidote for human players is to be aware of this AI tunnel vision and concentrate your defenses there.

Offensive Coordination

Offensives made by the AO tend to be adequate for invading small islands with up to three or four cities or for seizing a beachhead on larger continents. However, computer players seldom coordinate large-scale D-day-type invasions. Concurrently landing several transports in a coordinated attack on a huge landmass and setting up automated convoys of

steadily arriving reinforcements is not a forte of the AO. Therefore, with only an adequate, minimal garrison, you can usually prevail on your larger continents against computer-player invasions.

While computer players need not worry about simplicity or unity of command, mass and economy of force are principles that they rate below about average on. After observing computer players play each other over many games, it appears that the AO does concentrate some forces where the battles are (or where they are about to attack). However, they seldom strain every fiber to concentrate as large and decisive a mass of troops as they could. One persistent reason for this is their usual lack of available transports. There also appears no overriding desire in their programming for computer players to concentrate most of their forces for truly massive engagements.

Linear Maneuvers

The AO thinks along straight lines. If it is going to move somewhere, it will try to take the shortest path to that point. The roundabout, or indirect, approach is a maneuver that the AO seems incapable of. Seldom will they venture into the unknown with Viking-explorer transports (as explained in Chapter 10) or attack an unguarded continent of your best rearward cities in preference to the ones you have nearest them along the front.

Thus, AO maneuvers are "straight ahead only" against the landmass you have closest to them. They will come at you in the same old way, and you can beat them back in the same old way. Their only hope for achieving surprise will be in the timing of their attacks, but even that can be estimated once you get the hang of proper patrolling techniques and how their hate index works (see Chapter 13).

Matters of Security

The AO is not big on coordinated security efforts for its own defense. However, one consequence of its sporadic offense is that many units are left milling around in the rear and, thus, can often quickly form an effective defensive force. Computer players will tend to have many land units on their controlled continents (because they lack the transports and coordination to effectively move them off for more useful, aggressive purposes), which makes them pretty tough to oust. Remember to use the indirect approach when confronting these situations and to give preference to easier targets.

A particular weakness in the security routines of the AO is in patrols. As they fritter away their air force in land and sea attacks, few units are left for reconnaissance duties. This means that computer players can be quite easy to surprise since important travel routes will often go unmonitored.

TACTICS

Computer players seem to have their peculiarities in tactical doctrine as well. Most of these center on their use of aircraft and carriers.

Players will often press an air attack on a city to the point of the air unit's destruction. Even fighters will hammer a port city repeatedly in defiance of their survival odds. While this may seem a reckless waste, there is actually a formula that tells them to press their attacks in hopes of bombing a crucial unit or, for bombers, reducing the city's production efficiency by another 10 percent of its current value. When the computer feels that the rewards justify the risks, their air units seem downright suicidal. Often they will press these air attacks against enemy cities near the one that is their current objective, in an effort to slow enemy reinforcements there.

These aggressive attacks on cities, combined with a doctrine that uses airplanes freely in air and ground unit attacks, often leaves computer players without any surplus air units. These luck-pushing attacks will, by the middle of the game, leave them with few surplus airplanes with which to patrol or explore. As mentioned previously, this can cause the AO some real security problems.

Although cruisers are often used by human players, computer players tend not to employ them (and battleships) for city defense. Where human players often place these ships directly in cities and bombard approaching enemy land units and transports from there, computer players make no such tactical plans. Sometimes it works out that way for a computer player, but they have no tactical doctrine that makes this a common occurrence.

The AO likes to build carriers. Strangely, it doesn't seem to like basing fighters on them. When you sight a computer player's carrier, chances are that the air contingent on board is nil, particularly in the middle and late stages of a game. Therefore, you can operate with less fear of being spotted from a great distance, and your bombers can attack without too much worry about an AO carrier's fighter protection.

Finally, the AO seems unafraid to attack with carriers and transports. These are risky, low-odds attacks at best, but computer players make them with disturbing frequency. Go ahead and try to bait them into attacking with these units—the AO will often oblige.

ECONOMICS AND PRODUCTION

The heart of each computer player's production strategy is an artificial personality trait that decides what types of units he prefers to play with. This will make each computer player's troop mix weighted toward a particular production strategy. Most of these personality traits, however, tend to favor producing many ground units. When invading enemy territory, be on the lookout for a lot of defending land units.

No matter the units being built, cities with low production efficiencies will have them raised by computer players, but generally to a limited point. As explained in Chapter 10, the AO gives high priority to raising a city's production efficiency only to the point where it will get the unit it wants to build there quicker by waiting a turn than by starting right away. This production strategy builds units faster in the short run, but builds less of them over the long game due to keeping cities at low (20- to 50-percent) production-efficiencies. Computer players might raise cities above this 50 percent production efficiency ceiling, but the AO sets that as a low production priority.

The AO's production decisions are weighted slightly toward building specialized production unit types at cities that feature these. The main variation from the AO's goal of building a balanced mix of units, however, comes from several specific exceptions. Depending on local conditions, a computer player will adapt the production of nearby cities to achieve certain goals.

For example, if the AO sees one of its landmasses invaded, it is highly likely that all the cities there will switch to armies to defend it. If it sees a neutral city nearby and has no local armies, it will give priority to building them and conquering that neutral city. Similarly, if it has armies on an island and no transports, then building transports nearby becomes an immediate production priority.

Players of island scenarios where cities are scarce will recognize the clear need for building air bases. These are vital to exploration, security, and staging air-

planes from the rear areas to the front. The AO is not, however, a lavish builder of air bases. Computer players seldom take advantage of their many special uses. While this is only a slight weakness, under the right circumstances, it could be one that a human player can exploit.

Finally, as we've said repeatedly, the real chink in a computer player's production armor is in building transports. They never seem to produce enough and seldom use the ones they do have with enough caution and coordination to make them very effective. Transports will be your computer adversary's weak link. Attack his transports, therefore, at every opportunity. By doing so you will take away his land unit's mobility, leaving him unable to attack you or sufficiently reinforce his areas that you attack.

DIPLOMACY

While Chapter 13 explained how the *hate* variable works for each separate computer player when playing under the Standard or Advanced Game rules, we have noticed a particular phenomenon. Computer players can learn to hate each other. Often they will begin feuding with such intensity that their resources are stripped away from exploration and peaceful expansion into neutral areas to wage war against the hated foe.

This tit-for-tat effect often escalates into full-scale vendettas and creates a great opportunity for you sit on the fence and let those computer players knock themselves out while you expand elsewhere. Although they might be ignoring picking up easy neutral cities, that doesn't mean that you are as myopic. Computer players living out a mutual vendetta can be ignored while human players cherry-pick other areas until they are ready to subdue the weakened survivor.

WHO *ARE* THESE GUYS?

Certain things define each individual artificial opponent. Tracking their separate hate ratings toward other players is one such element that we've explored. Their individual player skill levels and randomly generated artificial personalities are the two other major variables that make each AO unique.

Computer-Player Skill Levels

Each computer player, when selected during setup, can be set to one of three different skill levels: easy, standard, and expert. The difference in each level is the amount of communication that goes on between units as each takes its turn moving.

Specifically, a unit belonging to an easy AO will immediately go after the nearest interesting thing it sees, or, if nothing interesting is happening nearby, it will do something random. In other words, it will not check with other units to see what they're doing—instead, each unit just goes off and does its own thing. The one exception is that land units and transports do coordinate their moves a bit (or else no land units would ever get off islands).

At the standard skill level, the computer player's units begin to talk to each other and coordinate their moves a bit. ("Hey, I'm going for this city, so you guys don't have to bother."). There is nothing too fancy here, just some simple, local coordinated moves. Think of standard skill-level opponents as knowing a few basic tactics.

Finally, at the advanced-skill level, the AO has an artificial general coordinating every one of his units. This artificial general will devise and execute a grand plan of action and adapt it to the larger, changing circumstances on the map. Think of advanced skill-level opponents as

having discovered rudimentary strategic thoughts and principles.

Computer-Player Artificial Personalities

As a dash of spice, each computer player as a limited artificial personality. These consist of only two unique characteristics, aggressiveness and a preferred unit-mix ratio for production. Both elements are influence factors designed to give play variations within sensible bounds. Neither variable will be set so extreme that it will produce a genuinely bad AO.

While the implications of the aggressiveness variable are self-evident, the production preference is more subtle. This might lean a computer player toward more fighters and fewer bombers, or more armor and less infantry—nothing so radical that it would throw its unit mix out of kilter, but enough so that it will create different tactical problems for you to defeat these different force balances.

Note that these artificial personality traits remain constant with a computer player throughout a given game. They are always newly generated each game, and are not attached to any specific computer opponent's name, rank, or player skill level.

ABSOLUTE LIMITS

Many strategy games impose an absolute limit on the number of pieces on the board or that any one player can own at a single time. *Empire Deluxe* has no such absolute limits on unit production. However, there can be a maximum of only 200 cities on a given map. Under the Advanced Game rules, having too many units will crimp a player's ability to produce more of them (see Chapter 10).

There is one quasi-absolute limit, though. The game turn counter only goes up to 64,000. If you ever play a game longer than 64,000 turns (ha!), the 64,001st turn will register on the counter as turn 1. In other words, you will have to reset the turn counter.

IT THINKS, THEREFORE IT IS

> The AI for *Empire Deluxe* was written entirely from scratch using every bit of experience and knowledge I've gathered over the years. And since I also wrote most of the original AI for *Empire*, it should be better.
>
> —Mark Baldwin

In this chapter you have put into perspective much of what you had previously learned about the AI in *Empire Deluxe* from previous chapters. Additionally, you have probed the computer player's mind and, hopefully, have learned a great deal. These secrets given to you concerning the logic used by the AO will help you to analyze, recognize, and counter the computer players' plans to destroy you.

Everything else we have to say has been swept into the next and final chapter. In it are all of the bits and pieces that didn't properly fit anywhere else in this book, but for completeness' sake, we wanted to make sure that they were included. For your last lessons in *Empire Deluxe*, turn the page to a potpourri of extemporaneous miscellanea.

Odds and Ends

After all the discussion in this book about everything from learning how to play *Empire Deluxe* to probing the very mind of the artificial opponent, what more is there to say? Well, we always seem to wind up with some interesting miscellany of items that don't neatly fit into any other chapter. For completeness' sake, we sweep them into this, the final chapter, for your reference. Here you will find a grab bag of assorted goodies, ranging from stupid computer tricks you can play with *Empire Deluxe* to illuminating notes from the game's designers.

MANUAL ADDENDUM

Page 174 of the manual is missing the text for notes a through l of the Table shown on that page. We have listed them below:

a. Attack is 1 when attacking armor and infantry in mountains, forest, and rivers.

b. Attack is 1 when attacking armor and infantry in mountains and forest.

c. May bombard infantry, armor, and air bases. Attack is 4 except if unit is in forest or mountain, when it is 2.

d. May bombard all ships except submarines.

e. Attack is 1 when attacking air units.

f. Attack is 4 when attacking bombers.

g. Attack is 1 when attacking fighters.

h. May bomb cities.

i. May carry up to 6 infantry or 3 armor.

j. May carry up to 8 fighters.

k. May hold an unlimited number of aircraft.

1. Attack is half normal and movement is reduced to 1 when damage is 1/2 or greater than its maximum damage.

Also, the manual occasionally references cruiser construction at 42 turns. This is incorrect; it is, in fact, 36 turns.

WHAT'S IN A NAME?

While you are probably aware that you can change the names of ships and cities during the game, did you know that you can modify the lists of these names that the computer initially chooses from? Well, you can—and it is quite easy, too.

These random name lists are all stored in the various .NAM files in your EMPIRE/DATA subdirectory. There are eight of them, one each for battleship names (BATTLE.NAM), carriers (CARRIER.NAM), cities (CITY.NAM), destroyers (DESTROY.NAM), computer players (LEADER.NAM), submarines (SUB.NAM), and transports (TRANS.NAM). By calling any of these files up in your word processor (or by using the EDIT command under DOS 5), you can delete old names and replace them with specific new ones of your own devising. Thus, enemy leaders might now include your friends, coworkers, or even The Terminator or Darth Vader. You might change your transport roster to include the Rust Bucket, Garbage Scow, or the Leaking Leaner. It's all up to you.

The most important rule to follow is that you do not *decrease* the number of names on each list. You can add up to 300 total names to the list (the computer will ignore any more beyond that). Be careful not to create names that are more than 20 characters long (or 12 characters for computer player's names). Only the first 20 characters will fit on the game's display screens. Save them without any formatting from your word processor or text editor (i.e., in plain ASCII).

Your custom computer names will appear whenever your computer's lists are accessed for a random name. If you are the master computer in a multicomputer connection, since all of the computer players "live" in the master computer, they will have your new names assigned to them. Players on other computers will have names chosen from their respective computer's name files. Go ahead and show off a little—invent your own ship, city, and leader names!

FOLLOW THAT AIR BASE!

In the initially released IBM version of *Empire Deluxe*, an amusing little bug crept in (and is squashed in the 3.10 version of the game; see below). When you convert a damaged armored unit into an air base, that air base can move! It moves like an infantry unit and can travel across all terrain types. Any planes stacked with a mobile air base move right along with it. Unfortunately, movement is the only order it accepts (you can't nail it in place with a sentry order, for instance). Thus, it must be moving one square on every turn.

PERSONAL INITIAL-PRODUCTION STRATEGIES

Everyone, it seems, has their preferred initial production, exploration, and conquest strategy. A player's early-game strategy is as personal as their hair style or the brand of drinks they consume. Here, the designers of *Empire Deluxe* and the authors of this book are sharing their initial strategies with you. All these are based on playing the Advanced Game using a regular, random map scenario.

Mark Baldwin's Strategy

Since Mark Baldwin programmed the artificial opponents, you will notice a great similarity between his playing style and theirs. (In a way, when you beat the computer players, you are beating Mark Baldwin—but that is very different from besting him in head-to-head competition, rest assured!)

Mark always starts the Advanced Game with a bomber unit for his initial build and uses it as a search vehicle. He doesn't consider the additional speed that a fighter unit provides of sufficient value for his needs. Instead, he prefers the long-range exploration capabilities of a bomber. In fact, he normally doesn't build any fighters until his first contact with the enemy.

After building his bomber, Mark goes for conquest of the island he starts on. He prefers building infantry units instead of armor in the early game. After conquering all that his land units can reach, he then builds a transport and fills it with infantry units. Mark considers early continents conquered after he captures his first city on them, immediately moving his transport along to the next one. This is his *seeding approach* for conquering new landmasses. Note that it is an excellent one that allows for rapid early expansion.

Bob Rakosky's Strategy

Bob prefers building a fighter initially, opting for quick exploration. Once built, he switches his production over to infantry units to capture all of the cities on his starting island. His first transport gets under construction with the fall of the island's third (or last) city, whichever comes first.

Bob is cautious when initially enlarging his empire. He believes in balancing expansion with development of defensive forces and an effective naval fleet. When he meets an enemy, Bob is prepared. Therefore, Bob usually wins his early battles with an enemy and pursues them aggressively after seizing the initiative from them.

Alan Emrich's Strategy

Alan prefers to build a fighter first and then switch production over to infantry units. When he captures his first neutral city, he begins transport production. Generally, he keeps one of his first three cities building transports while the other two feed it land units.

Because Alan is so "AR" (Anal Retentive), he likes to circumnavigate a continent with his initially loaded transport, seeking out port cities and attacking them as they are discovered. He also believes in frittering away early infantry-unit production by converting them into air bases. Alan builds them in remote areas and uses them to increase his initial fighter's exploration range so that his transports will have a good idea where to go next. Alan likes a lot of information coming in, so he explores aggressively right from the beginning.

Mark "skulker" Carroll's Strategy

Our skulker has a radically different style. Shunning airplanes as his first choice in production, skulker builds nothing but infantry units from his initial city until his starting continent is completely controlled. When he captures his first neutral city, he starts building transports. His second captured neutral city goes into bomber production. He'll use those airplanes immediately to enhance his early exploration efforts. Although his initial exploration is slow, ultimately the bombers begin to arrive, and their discoveries will eventually direct his infantry units and transport toward subsequent conquests.

Mark adds that when he sees from the outset that he is stuck on a one-city island, he builds a transport first. After it is built, he switches to infantry units and uses the transport for a few quick turns of exploration while the first infantry unit is under construction. He'll sail off with that single army while others are being built and awaiting the return of his transport.

THE 3.10-VERSION UPGRADE

At the time this book was written, the authors worked, primarily, with late beta copies and, finally, with the released MS-DOS 3.0 version of *Empire Deluxe*. As we put this last chapter to bed, we learned of an upgrade to the game that changed a few features and squashed a few bugs. These have been released in the 3.10 version of *Empire Deluxe*, which is available directly from New World Computing or can be downloaded from the GEnie or CompuServe networks. A list of the improvements and fixes is given below:

Feature Changes

- A new README.TXT file has been created.
- Human-player aircraft with Auto Explore orders will now take advantage of air bases as well as cities when looking for new vantage points to explore from.
- Three new handicap levels have been added. Actually, these are player advantages rather than handicaps. They would integrate into Tables 9.3 and 10.3, as shown in Table 16.1.
- When a unit's pop-up information display is opened, the Move To orders displayed do not reference grid locations anymore. References are now made by direction and distance, as show in Figure 16.1.

Figure 16.1 The grid-coordinate numbers have become descriptive text.

- A unit on sentry duty or loaded on board a ship now has its orders cleared when given an Activate command.
- A neutral city will have its odds of victory reduced each time it is attacked. Specifically, the odds are presented in Table 16.2.
- A new command, End Turn, has been added. There is no keyboard equivalent, so you have to access it from the pull-down menu, as shown in Figure 16.2. When selected, all your units not yet moved on this turn receive a Skip Move order. If you have any airplanes in dire need of landing, you get an opportunity to move them, after which your turn automatically ends.
- A saved game may be specified at the DOS prompt on the command line. The specified game, that was previously saved, will be loaded. Thus, to start your saved game MEGAMAP.SVG without going through the game's opening screens, you can type EMPIRE MEGAMAP.SVG.
- A new user preference has been added to turn off color cycling of the oceans in 256-color mode.

TABLE 16.1: NEW HANDICAP PERCENTAGES WITH ADVANTAGES

HANDICAP	OVERALL PRODUCTION- & COMBAT-EFFICIENCY RATING PERCENTAGE	COMBAT-FORMULA EFFICIENCY MULTIPLIER	COMPARATIVE TURNS TO BUILD A PLANE
Advantage 3	400.0%	4.000*	3
Advantage 2	200.0%	2.000	6
Advantage 1	133.0%	1.333	9
None	100.0%	1.000	12
Slight	90.9%	0.909	13
Moderate	80.0%	0.800	15
Average	66.7%	0.667	18
High	57.1%	0.571	21
Severe	44.4%	0.444	27
Extreme	33.3%	0.333	36

* Automatically captures *neutral* cities when attacking.

TABLE 16.2: PERCENTAGE CHANCE OF CAPTURING A NEUTRAL CITY

ATTACK AGAINST IT	PERCENTAGE CHANCE OF CAPTURE
First	1/2 or 50%
Second	2/3 or 66%
Third	3/4 or 75%
Fourth	4/5 or 80%
Fifth	5/6 or 83%
Sixth	6/7 or 86%
and so on . . .	

- The computer now remembers each player's last zoom level. Thus, when a player's turn comes around again, it will reset the zoom

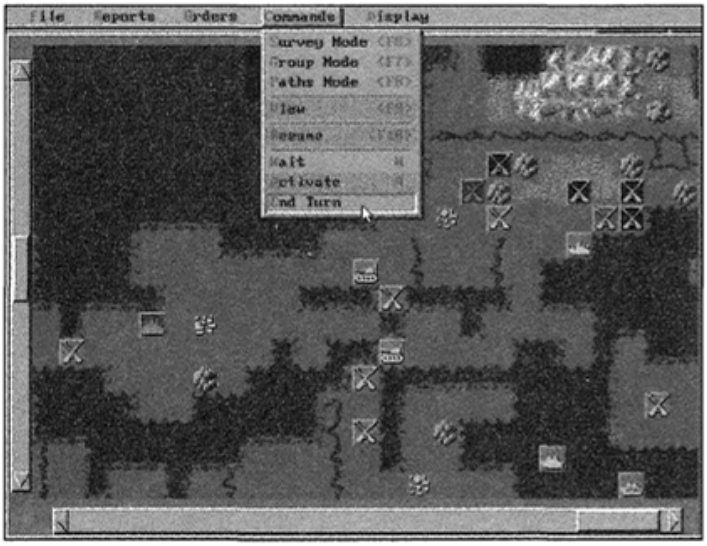


Figure 16.2 A new End Turn feature has been added.

level to his or her preference automatically.

- Units that move under a previous turn's orders will now do a temporary movement break on moving next to the first enemy unit. This gives the owner a chance to react to this new threat.
- When using the keyboard to move the cursor, holding down the shift key now causes the cursor to move five squares at a time.
- When a scenario is loaded with more than one city owned by a player, the game will give the player the option of automatically setting all city productions to armies. This is shown in Figure 16.3.
- Saved games, PBM games, and modem games now have more security to discourage cheating. Modem games now use passwords.
- Saved games are now much smaller. These files are automatically compressed when saved and decompressed when loaded. This provides the double advantages of making them cheaper to transfer by way of modem (because this process takes less of your valuable connect time) and harder to break into for purposes of cheating (compressed code is more difficult to hex-edit). The amount of compressing varies, but Table 16.3 shows some examples. Happily, the larger the game, the greater the percentage of compression is achieved by this new feature.

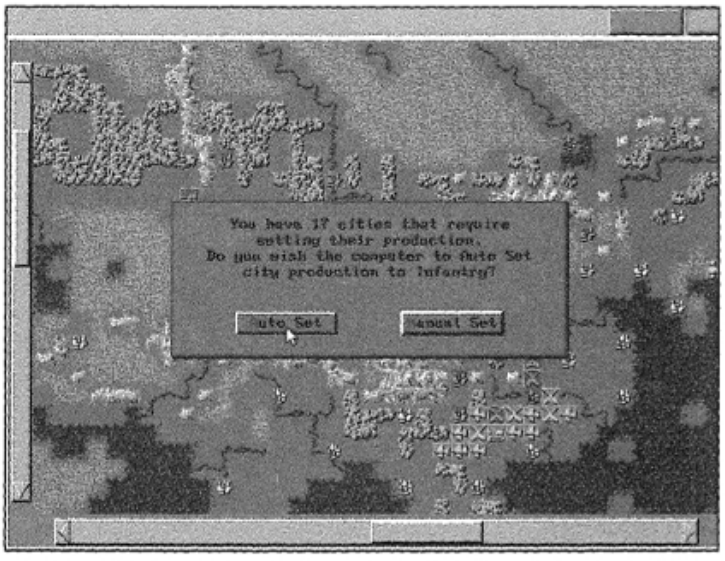


Figure 16.3

Bug Fixes

- When trying to delete a file that does not exist, the program will now report an error.
- Minor grammatical and spelling changes have been made.
- Due to a bug in some versions of *Empire* 2.xx, *Empire Deluxe* would not load some map files generated by *Empire* 2.xx. You can now load those map files. Also, city-initialization problems with loading *Empire* 2.xx maps at the start of a game (as opposed to loading it into the editor) have been fixed.
- In the map editor, if a map was resized, some coastal regions might not be redrawn properly. This problem has been fixed.
- In certain circumstances, city specialties might be lost. This has been fixed.
- A problem with the AO disbanding units too aggressively has been fixed.
- Some SVGA problems with certain graphics cards that use the VESA standard have been fixed.
- Some sound-degradation problems with the PC speaker and certain sound cards have been fixed.
- Network problems with Windows for Workgroups have been fixed. However, a problem may occur if you are running the game in a DOS window from within this program, unless a change is made to your AUTOEXEC.BAT file. There is a line placed in this file by the Windows for Workgroups

TABLE 16.3: VERSION 3.10 SAVED GAME FILE COMPRESSION

GAME-MAP SIZE	NUMBER OF PLAYERS	.SVG FILE SIZE UNDER VERSION 3.00	.SVG FILE SIZE UNDER VERSION 3.10	PERCENTAGE OF COMPRESSION ACHIEVED
20 x 20	2	5424	4068	25%
60 x 100	3	27611	16469	40%
100 x 150	6	110526	48588	56%

installation—"<path>NET START"—that must be changed to read"<path>NET START NETBEUI." By making this change, you will accomplish two things: First, the network support will work properly in *Empire Deluxe* while running in a Windows DOS shell. Second, you will not need to have Windows running to have the Network driver available for *Empire Deluxe* to use.

- Problems with the disk compression software included in MS-DOS Version 6.0 causing the player to rerun ECONFIG.EXE have been fixed.
- Problems with units on transports not being activated until the turn after an unload command was given have been fixed. (Hooray!)
- Problems with multiple modems attached to one machine have been fixed.
- Memory management has been reorganized such that out-of-memory errors (if you are getting any) will be a little less frequent.
- A bug that allowed damaged armor units to convert into moving air bases has been fixed.
- Several other minor bugs were fixed.

Revised Scenario Play-Balance Suggestions for the 3.10 Version

Now that player advantages have been introduced, it is possible to better balance game play of the three different World War II scenarios included with *Empire Deluxe*. The designers have been tinkering with them and suggest using the information in Table 16.4 to set the new player production and combat handicaps when using the 3.10 version of *Empire Deluxe*.

Note that these are ranges of handicap-level settings. Depending on player skills (computer players will probably need an extra edge against humans who have read this book) and the handicaps of other players, you should find your own perfect balance.

MUSIC AND SOUND EFFECTS (BY ROB WALLACE)

I, Rob Wallace, met with Mark Baldwin and Bob Rakosky at the Computer Game Developers Conference in April 1992. At that gathering of computer gaming gurus, we agreed that I would

TABLE 16.4: REVISED WORLD WAR II–SCENARIO HANDICAPS

SCENARIO/SIDE	PRODUCTION HANDICAP	COMBAT HANDICAP
2-Player/Axis	None to Moderate	Advantage 1 to None
2-Player/Allies	Advantage 1 to None	None to Moderate
3-Player/Axis	None to Moderate	Advantage 1 to None
3-Player/U.S.	Advantage 1 to None	None to Moderate
3-Player/Russia	Advantage 2 to Advantage 1	Slight to Normal
4-Player/Germany	None to Moderate	Advantage 2 to None
4-Player/Japan	Slight to Average	Advantage 1 to Slight
4-Player/U.S.	Advantage 1 to None	None to Moderate
4-Player/Russia	Advantage 2 to Advantage 1	Slight to Normal

The authors would like to give special thanks to Rob Wallace for allowing us to listen to his tale (and music and sound effects) and share it with our readers.

provide the music and sound for their next project, *Empire Deluxe*. I was glad to be doing another game for developers published by New World Computing, with whom I've had a good working relationship.

Bob and Mark went to great lengths to explain the unique nature of the game and how they wanted the music and effects integrated into it. I was impressed with their ability to get their ideas across clearly to me. These were designers who knew what they wanted, which made my job that much easier.

First, I researched Edvard Grieg's *In the Hall of the Mountain King*, from the *Peer Gynt* suite (1875, re-orchestrated 1886), which he orchestrated toward the end of the romantic period of classical music. Grieg's music held up well—it is fresh and powerful. (I wish everyone had a Roland MT-32 so that they could hear the full texture score.) Bob and Mark wanted this music to be the model for the main title theme, the victory music, and most (but not all) of the incidental music.

Edvard Hagerup Grieg (1843–1907) had a piano style similar to Chopin's, but the influence of Norwegian folk songs and dances was a constant force in his creative spirit. This influence is clear in the main title music for *Empire Deluxe*, particularly in the Aeolian modal lowered seventh, alternate major-minor third, frequent droning bass lines, and Lydian mode raised fourth.

In the victory music, when you win the game, I change keys to create more melodic movement. When transformed to the Aeolian, Mixolydian, or Dorian modes, the harmonies become very lively.

I wrote two pieces of original music in the

score along with a few small additions and bridges in the Mountain King pieces. The music played when you lose is an original, along with the player-cue piece that prompts you when action is needed.

The sound effects for *Empire Deluxe* came from two sources: my 9,000-effect bank of digitally recorded, stereo CDs (I have quite a library) and from my personal archives of clips I've collected from my work in advertising, the film industry in Hollywood, and bizarre sources from my 30 years in the sound and music business.

For example, the tank effect is from an outtake of a foley-mix track for an Italian war movie never released (circa 1966). One of the explosions of artillery was recorded by me in Denver when I was in high school: a friend found a gross of cherry bombs, and I was on-site when it went off up in the foothills. I simply altered in frequency and number of samples in the .VOC waveform file to achieve a fatter sound.

For those interested, I am Rob Wallace, Executive Producer at Wallace Music and Sound, Inc. (Music and Sound Effects for Software Developers), 6210 West Pershing Avenue, Glendale, Arizona 85304; telephone: (602) 979-6201; CompuServe: 71042,1410

EMPIRE DELUXE DESIGNER'S QUOTATIONS

It is fitting that, for the closing section of this book, we turn over our pages to the thoughts of Mark Baldwin and Bob Rakosky. Although we have arranged these quotations by subject matter, they were primarily taken from longer statements (either told to us or posted as bulletins on-line). Here, then, are the last words from the minds of Mark Baldwin and Bob Rakosky.

Specific Game Features Included

When asked about the idea of allowing cities that are not attacked over a long period of time time having their defenses improve, Mark Baldwin responded thus:

"I never considered increasing the defense strength of a city the longer it is owned. For the first 10 seconds, I liked the idea. But the more I think about it, the more I think it could damage game play by making cities too impregnable."

When asked about the fact that every city could possibly specialize in infantry-unit production, Mark Baldwin gave the following reply:

"Probability theory is a good enough check and balance on this sort of thing for me."

Regarding other included game features, Mark commented as follows:

"My new method of counting cities (only the ones the player has seen) is better than showing the total number of cities in the game, as in the old *Empire*. Yes, some people will object, and I can even understand their objections. Somebody is going to object to every change I make. At some point, I have to design the game the way I want it to be. This is how I always design a game. I try to get as much input as possible, but I have to be the final filter of that input."

"The reason for the change in the handicapping was clarity of play. For the grognard [veteran wargamer], a percentage slider made sense. However, for the vast majority of users, this feature confused them. The change was to make the handicapping system understandable by everyone."

"There is an (undocumented, I think) command-line switch with the install program. Use either '-v' if you have a VGA or better display

or '-e' if you have an EGA system. One of the first things the installation program does is attempt to autodetect the type of graphics board (and possible SVGA board) that you have. Hardware autodetection is still a 'black art,' especially with things like SVGA boards and sound cards (which is why we don't attempt to autodetect the sound cards)."

Specific Game Features Excluded

Mark Baldwin:
"*Empire Deluxe* is a game, not a simulation. I think of it as being approximately a World War II model, though. (That is just my internal model, not the design spec. of the game.) The game itself is purposely nebulous technology. It was designed for entertainment, just like chess, Risk!, bridge, or Monopoly. (What is the technology level of chess or Risk!?) *Empire Deluxe* is not a military simulation, nor was it ever meant to be."

"There are many examples of ideas that I've had or have had suggested and then had to throw out; for example, each new feature I added to *Empire Deluxe* we examined, thought about, and kibitzed over. Every idea had to add a great deal more to game play than it took away from it. There were so many things that just didn't make it.

"The result of this process, I think, has been very good. But I also know that I'm going to get a lot of criticism because I didn't include many things <grin>."

"There is no unit list in *Empire Deluxe*. I was trying to get away from coordinates and, therefore, felt that screen would be useless. I've had some second thoughts on that subject, though, and may implement something equivalent in the future."

"As for nukes, I am strongly against such rules (which means you'll probably not see them). There are a couple of reasons here. One is that I think that they will throw the game balance way out of kilter! Second, although it's purposely left ambiguous, I think of *Empire* as a World War II technology game, for which nukes would be inconsistent. Third, I used to plan real nuclear strikes. This gave me enough nightmares to last the rest of my life, so I find the inclusion of nukes to be personally repulsive."

"One of my philosophies is that if you give a game player an option for changing the game, that option must be nonobtrusive and it must also have a high payback in entertainment value for all or most of the users, not just a few of the users.

"This philosophy is based on the assumption that too many options clutter up a game, decreasing the game player's enjoyment because he or she is being forced to make design decisions instead of game-play decisions. Note that no one 'option' causes this problem. It is the accumulation of options. This makes it much more difficult to object to adding any single option, yet because of the subjective nature involved, [any such additions] must be fought against."

"Picking a random map was a poor alternative to generating a random world. With the random-world generator, random map selection wasn't felt to be needed."

Oh, My Achin' Luck!

Mark Baldwin:
"*Empire Deluxe* uses a well proven pseudo-random-number generator with the clock generating the initial seed. Because of complaints about the luck not seeming right in the old

Empire game, I set up a major statistical test on the world generator and combat formulae to confirm randomness. It passed with flying colors. Assessments that the numbers aren't random, therefore, are probably psychological and not real."

Artificial Intelligence

Mark Baldwin:
"Let me point out a theory about AI that I've always carried. AI should be as tough as possible, but should always lose. People do not like to be beaten by the computer. It can destroy the entertainment value of a game. However, beating the computer after a very tough battle creates the best entertainment value."

"One must remember that the computer, no matter how powerful it is on a relative scale, is still a very stupid machine compared to most human minds. As such, without investment of huge amounts of resources (roughly hundreds of man-years) or designing a game that specifically takes advantage of computers' pluses and humans' minuses, one will not see 'good' AI. It's a fact of nature. As a result, my goal in AI designs is to be interesting and challenging, not necessarily competitive."

About the Design Process and Design Philosophy

Mark Baldwin:
"The design process of a game incurs many admittedly arbitrary decisions. But the filter for those decisions is 'either it works or it doesn't.' If it doesn't, you throw it away and try something else. Because of this, there are always a few decisions made during a game design that are there for no other reason than 'it worked.'"

"Our basic design philosophy is: 'Features that do not enhance game play for a majority (or at least a large minority) of the game players are actually a detriment to the game and should be avoided!' Now, I know that many people will disagree with this design philosophy, but it is how White Wolf tries to design their games. If we're wrong, we'll just go broke and someone else will a different design philosophy will succeed. However, experience and success has convinced us that we are probably right."

"Programmer training is very low on the priorities of what it takes to be able to design and implement a good computer game. Characteristics like creativity, drive, and a wide knowledge base are much more important."

The Computer Game Business

Mark Baldwin:

"The nature of this business (and it is a business where we are trying to make a living) is that one must stop putting in features and finish the game at some point. Even if it is not perfect. Even with some weaknesses, I find *Empire Deluxe* to be vastly superior to anything else on the market."

"If you really want to work in our industry, expect a major pay cut (especially for an engineer, which I used to be). There are two major approaches to this problem. The first is to get a job with a publisher or design house doing anything you can. The other option is to try to write your own game and sell it to a publisher. This is a much more difficult proposition, and one that gets harder every day. I do not recommend it."

Beyond the MS-DOS Platform

Mark Baldwin:
"In the near term, we are planning on a

Windows version and a scenario disk for *Empire Deluxe*. Bob is trying to figure out Windows (and is cursing it out in the process). A Mac version will also be developed (I hope), but that will be an out-of-house project.

"Although we were working on an Amiga version, the project has been frozen and I have my doubts whether it will be restarted again. Although there were several reasons for stopping the work, the major one is simple. There just are not enough software sales for the Amiga any more to justify the work. There will not be an Atari ST version."

"Scenario files can be transferred between machines, [and] assuming we don't screw up the Macintosh version <grin>, across machine types as well. Also, *Empire Deluxe* will read in most maps created by the old *Empire* game."

Cheating

Bob Rakosky:
"First, the Save-as-Scenario/Save-as-Map features are disabled during a play-by-e-mail game. During a 'regular' game, yes, you can cheat. That is your choice, and if it diminishes the 'mystique of discovery,' then you have only yourself to blame, no?

"As to cheating during a play-by-modem game—unless you want to break the modem connection, you can't get into the game editor. Yes, if you are running a multitasking system, it is possible. (Although it is quite dangerous to be running two tasks of *Empire Deluxe* from the game directory; it could easily crash.)

"The bottom line, in my humble opinion, is that if you want to cheat, you're going to cheat. This is an entertainment product, not a Department of Defense project. Personally, I wouldn't want to play a game against someone who cheats, so I might be a bit more careful choosing the people I spend my leisure time with.

"There is a limit to what can be reasonably done in the design to discourage cheating. I'm convinced it's more of a 'human' problem than a 'technical' problem, and I'd rather implement a feature that has value than not do it because it could be 'misused.'

"For example, you can restart the game and change your remote opponent to a computer player, which will allow you to finish a game even if your opponent is unable to finish it (for whatever reason). Except for play-by-e-mail games, any player in a restarted game can be changed to a different player type. This allows for some interesting situations. For example, you can be playing a game against a computer opponent, play halfway through the game, and then 'switch sides' to see how you fare in battle against your own successes in the first half of the game."

Beyond *Empire Deluxe*

Bob Rakosky:
"As to new scenarios, we are planning to release a scenario disk. Other folks are also able to create scenarios and freely distribute them if they want. I would expect that many will be appearing on-line after people have had a chance to work with the game and scenario editor a bit."

Mark Baldwin:
"There are several factors [to be considered] if there will be a major upgrade of *Empire Deluxe* or not. One of them, obviously, is sales. But I will say that we would like to do a major upgrade. I'm keeping notes on what I want to do for it. These notes have been greatly influenced

by comments and suggestions I get from users (and I do get a lot), plus what I think would make a great game even better. I'm going to pick and choose and modify *Empire Deluxe* very carefully. I won't just throw every suggestion in and see what happens!"

"Right now, the only plan for *Empire* II is a one-page idea study. What will actually happen? I'm not sure yet, so don't hold your breath <grin>."

A Little Humor and Insight

Bob Rakosky:
"As for the statement about infiltrating Corporate America [and destroying its productivity by releasing *Empire Deluxe*'s addictive play qualities on their computer networks], that is one of my hopes for it. Originally, I said that I wanted to bring Corporate America to its knees, but I've matured since then. I'm willing to compromise: I'll be happy if Corporate America declares Fridays as '*Empire Deluxe* day' <big grin>."

"Since *Empire Deluxe* also includes a Basic Game with simplified rules, you probably can get your wife hooked on it as badly as you are. Then she won't give you a hard time about ignoring her. This can work out very well if you buy that new computer you've been wanting and give her your old one <grin>."

Mark Baldwin:
"My dream project? I would like to do Robert Heinlein's 'Starship Troopers' as a joining of the role-playing genre, the wargame genre, and the simulation genre. This project has been on my mind for years, but it requires a license and a budget that is far beyond what we can afford (if I'm going to do it the way I want). So I keep dreaming about it <grin>."

STAYING IN TOUCH

To get in touch with any of the main characters in this book, here is how you can contact them:

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P.O. Box 4302
Hollywood, CA 90078
Customer Service: (818) 999-0607
Direct Sales Orders: (800) 325-8898
Administration: (818) 999-0606

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GEnie*: mb
CompuServe: 73637,3032
Usenet: 73637.3032@compuserve.com

Bob Rakosky
CompuServe*: 76703,4254
GEnie: b.rakosky
Bix: brakosky
Usenet: 76703.4254@compuserve.com

Alan Emrich
(c/o Computer Gaming World magazine)
Prodigy: EXPT40B
CompuServe: 76703,622
GEnie: CGW
America On-Line: CGW
The Sierra Network: Box 1048

Mark Carroll
CompuServe*: 71611,2332
* Preferred

SO LONG FROM THE TRENCHES

For those who are interested, Alan Emrich did the writing for this book. Mark Carroll did the math for the myriad tables presented herein and the final fact checking before the manuscript

was sent off to the publisher. It consumed an average of 26 hours per week from Thanksgiving of 1992 through Tax Day of 1993 for Alan to write this, his third computer game strategy guide. Based on his advance, Alan made about $3.30 per hour (before taxes) writing it.

Why would anyone give up so much of the time they would normally spend enjoying life and write like a slave for below minimum wage? That is an easy question to answer (but a tough one to explain). Alan and Mark love what they do. They truly enjoy being involved in gaming and sharing the fun of it with others, even when it means more work for them.

Empire Deluxe is a game with a long past. There is no doubt that it will also have a long future. If there are revisions to be made to this tome down the road, we'll be there to make them. We're looking forward to any future expansion disks, seeing *Empire Deluxe* released on computer platforms other than MS-DOS, and even the possible release of an "*Empire II*" sometime in the future.

Wherever strategy gaming goes, look for Alan Emrich and Mark Carroll to be there, bringing you the inside information. We'll see you on-line! Meanwhile, be sure to read the About-*Empire* section located on the Menu bar under Reports (or press Alt E). It's good for a few laughs.

Appendixes

The History of *Empire Deluxe*

Although initially released for MS-DOS computers in March of 1993, *Empire Deluxe* isn't really a new game at all. Instead, it is a finely enhanced version of what is, arguably, the "elder statesman" of computer strategy gaming, *Empire*. If ever the expression "everything old is new again" had any validity, *Empire Deluxe* would make a good case in point. The most widely played edition of *Empire* was released by Interstel in 1987. On IBM systems, the latest version of this game was v2.05C.

Empire has long been regarded as a game with an addictive/compulsive play quality to it that is difficult to explain. Undoubtedly the combination of a random, hidden world to be discovered by simple unit types as they interact in battle with the goal of world conquest has some a somewhat innate, universal appeal. Certainly, this combination of ingredients has made *Empire* an elegant masterpiece of strategy-gaming simplicity, duplicated in spirit by many, many other computer games, including *Strategic Conquest*, *Sid Meier's Civilization*, *Global Conquest*, and *Dune II*. Untold scores of thousands of otherwise productive hours have been spent by enthusiasts playing this game over its many years in existence, which looks as it appears in Figure A.1.

Perhaps no other computer strategy game has achieved the same type

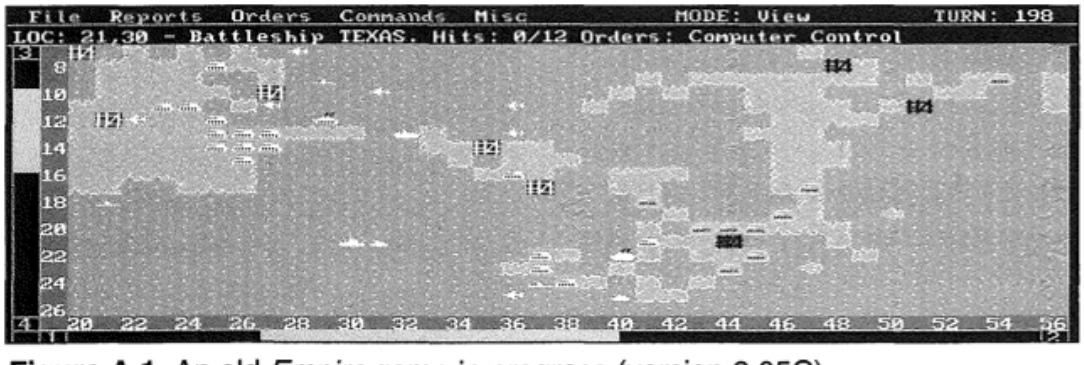


Figure A.1 An old *Empire* game in progress (version 2.05C).

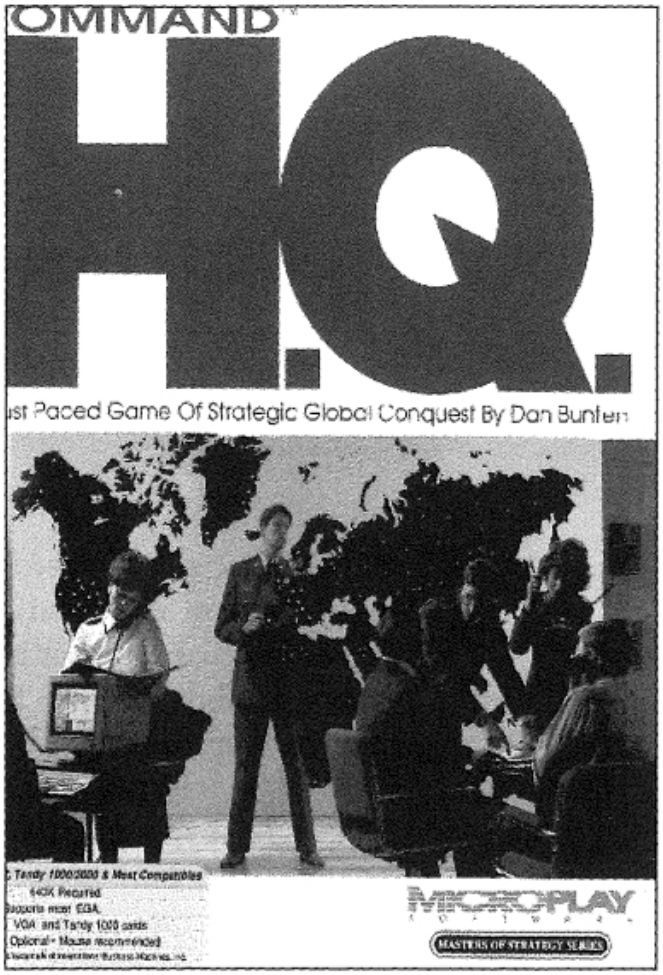


Figure A.2 *Command HQ* is more of a "war" game than is *Empire Deluxe*.

of dedicated following that *Empire* has. In fact, *Empire* has become something of a cult game. Many play-by-electronic-mail tournaments have been organized on the various computer networks (such as CompuServe and GEnie) over the years, and *Empire* itself was selected as *Computer Gaming World* magazine's Overall Game of the Year in 1988 (being inducted into its Hall of Fame in 1989). By every yardstick, *Empire* has measured up to be a winner among its computer-gaming peers.

NOT AN HISTORICAL GAME, BUT A GAME THAT HAS MADE HISTORY

"*Empire Deluxe* is a *game*, not a simulation. It was designed for entertainment, just like chess, Risk!, bridge, or Monopoly. It is not a military simulation, nor was it ever meant to be."

—Mark Baldwin

Some strategy games are about history. These historical simulations, colloquially called "wargames," are not unlike *Empire* (many owe their roots to *Empire*, including such popular titles as *Command HQ* and *Civilization*). These wargames, however, work in a clearly defined reality. In *Command HQ*, for example, the game is played on a map of the Earth, with scenarios covering World War I, World War II and a hypothetical 1986 World War III scenario (among others). In *Civilization*, while one can play either on a map of the Earth or a randomly generated map,

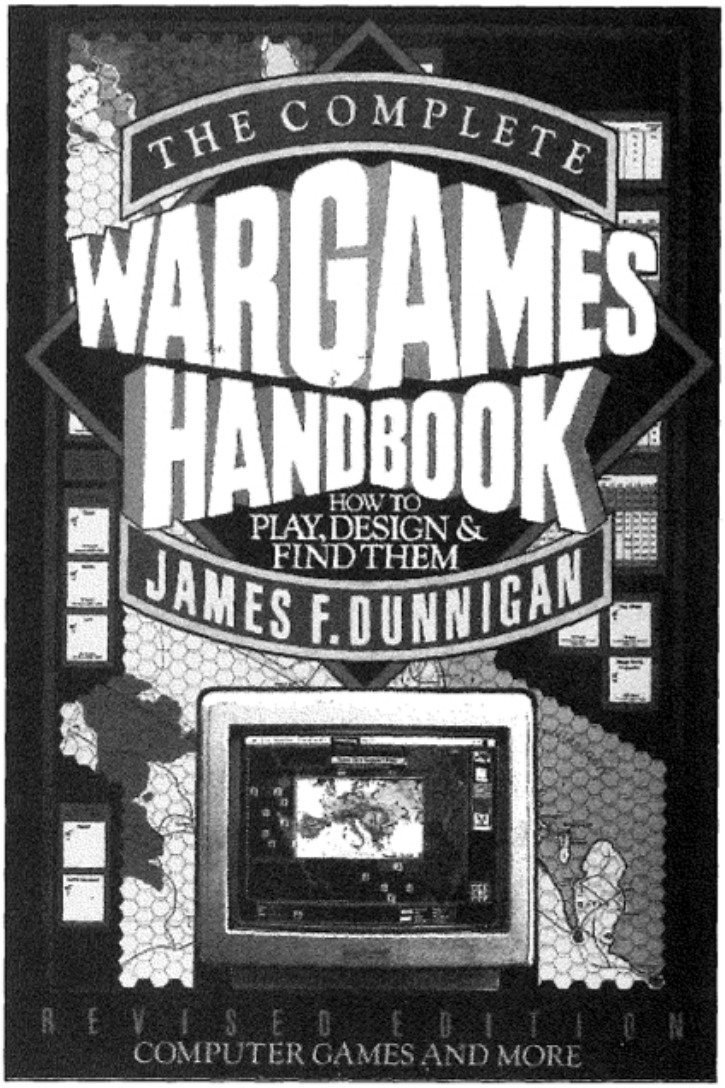
players must still make their discoveries along historical lines, beginning with the wheel, the alphabet, etc., and progressing to nuclear power and the space race.Figure A.2 *Command HQ* is more of a "war" game than is *Empire Deluxe*.

In *Empire*, the strategy elements of warfare are there, but the game's premise is relieved of any historical basis in fact. When a cruiser sinks a transport full of infantry units, there are no nationalities wronged, no representations of "real people" to be counted as casualties, nor any great social causes advanced or hindered. With only a small basis in reality, *Empire* has long been enjoyed, rightly, as "just a game" by its legion of fans, both those who would consider themselves "wargamers" and those who wouldn't.

The Philosophy of *Empire* Begins with PLATO

In his *Complete Wargames Handbook*, published by Morrow in New York, Jim Dunnigan has put together a fantastic reference for both board and computer war and strategy games. In the chapter on computer wargames (under "Genealogy of Computer Wargames Technology"), Mr. Dunnigan offers the following insight into the early evolution of modern computer strategy games, and mentions, in particular, *Empire*:

> In those early days, much of the action was at places where the computer resources were, essentially, "free" to developers and users alike. One such location for wargamers who were programmers (including Chris Crawford) was the PLATO project, a multi-user educational system then under development at the University of Illinois (at Urbana) and heavily supported by supercomputer manufacturer CDC. Begun in the late 1960s, by the mid-1970s there were up to a thousand users on the system at once. The system was quite advanced for its time, with graphics equal to the early Macintosh computers 10 years in the future. I was invited out to the university in 1969 to give a lecture and wasn't all that surprised that many wargamers were working on the system, or that wargames would appear on PLATO eventually. During this period, a number of innovative games were developed for [the] PLATO system, including a 3-D Star Trek game and more elaborate version of Adventure. By the late 1970s, PLATO had multi-player games, something that did not see commercial availability until the early 1980s on the CompuServe network. Many of



the PLATO games eventually turned up as commercial products (Collapsar, *Empire* plus tank and flight simulators). In some cases, the PLATO games served as models for later commercial products.

Just the VAX, Ma'am

Before it was released as *Empire*, the original mainframe-computer program of this game was copyrighted by Walter Bright and Northwest Software. However, the source code to the game was distributed by DECUS (The DEC USers Group), and *Empire* became a de-facto "public domain" program by sheer force of will, although this was not, legally, the case.

How could this happen? Well, in those early days of programming, anarchy reigned. Most programmers believed that software should belong to everyone, free of charge, for all time. (Later, when they started to become "stars" for companies like Electronic Arts and Sierra, and began to discover what their work was worth, they rapidly reversed their opinions and proclaimed the importance of copyright to intellectual property, and have bemoaned the lost revenue from software pirates ever since.) Thus, this early sharing of source code for *Empire* was quickly hacked, stripped of its copyright statements, and distributed among many programmers beyond its intended shared-user base. Consequently, while the game was never originally intended for release in the public domain, many old, allegedly public-domain, versions of *Empire* still exist.

How many? Well, the answer can be found by tapping into the InterNet, a computer network that links universities from around the world together to exchange ideas, information, and, apparently, variations of the game known as *empire* (with a small 'e'). The following section is an abridged version of the information available on the InterNet on the subject of public domain games that are variations of *Empire*.

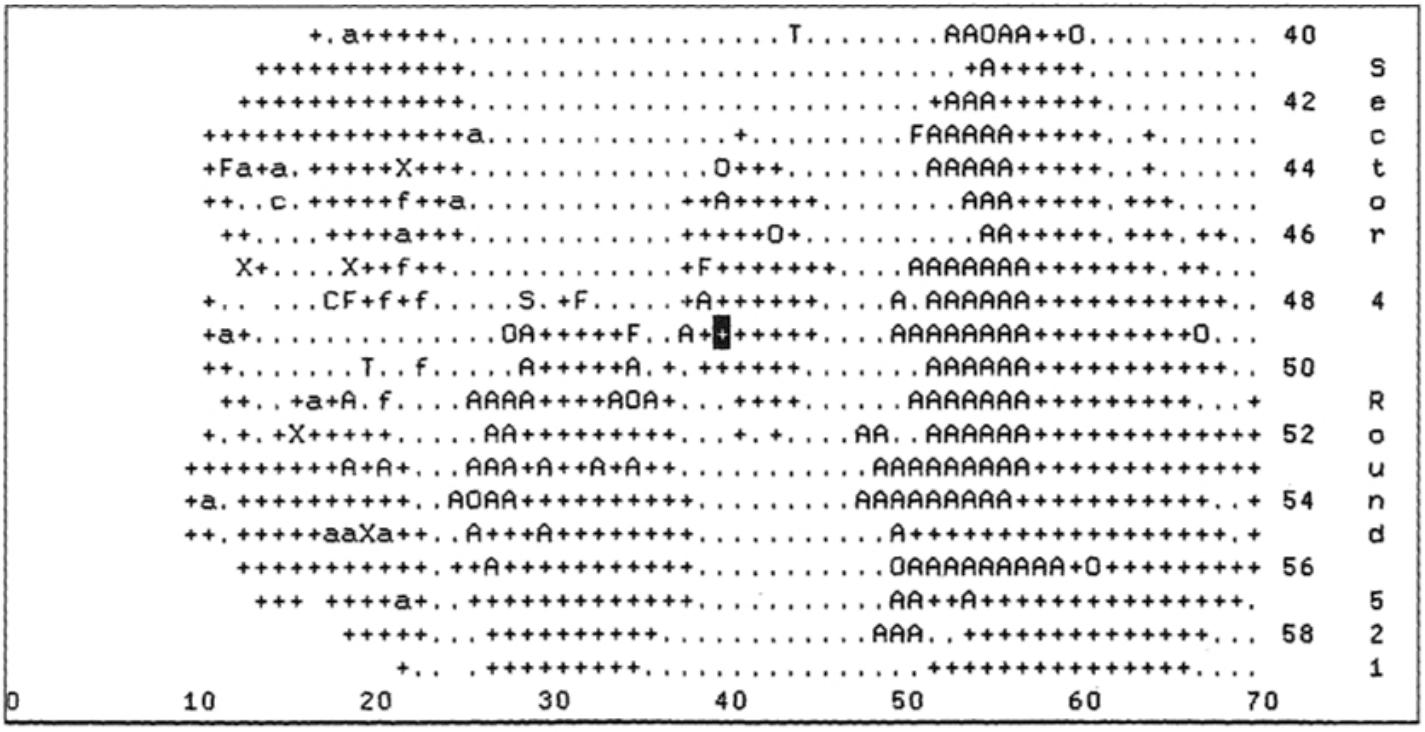


Figure A-3 A printout from the old mainframe edition of *Empire*. ASCII characters were used to represent land (+), ocean (.), friendly armies (A), enemy armies (a), friendly cities (O), enemy cities (X), and so forth.

Subject:	*Empire* Compilation
Date:	03-Mar-93 at 18:47
From:	INTERNET
>Subject::	Versions of *empire*—monthly posting
>Organization:	University of California, Berkeley
>Distribution:	World

Versions of *Empire*

There are many games that go by the name of *empire*. Here are the details on some of them.

Name:	BSD Empire
History:	Starting with *UCSD Empire 0.9.10,* the source code was cleaned up and reorganized by Dave Pare and the Experimental Computing Facility (XCF) of U. C. Berkeley. Since then, development has continued under the guidance of Dave Pare.
Features:	+ Multiplayer + Fixed update times + InterNet-server-based + Planes, nukes, satellites, ships, market, distribute + Hexmap + Actively supported
Limits:	256 players, 1024x1024 world
OS required:	BSD, SunOS [34].*, HP-UX, Domain 10.2, AIX 2.2.1, Ultrix, DYNIX

Name:	BSD Empire—KSU distribution
History:	the "Kent State" mods add features to BSD *Empire* 1.1 patch5.
Features:	+ ABMS + Conventional ASATS + Many bugs fixed, some introduced

Name:	BSD Empire—Chainsaw Distribution
History:	Modifications from BSD 1.15/KSU/MERC *empire*. Adds many new features and niceties, and fixes many old bugs.
Features:	+ New nuke options (1 sector nukes, nukes requiring research) + New multistage war-declaration procedure + Noninteger gun ranges + Trade ships are added as a way of generating income + Ships now have fuel capacity and usage + Ships carry different numbers of different types of planes

+ Antisubmarine planes/mine-laying planes/mine-clearing planes
+ Each plane has a separate stealth rating
+ Multiple ships/sectors can fire at once
+ Ships may have retreat paths/conditions specified
+ Budget command for examining/prioritizing production
+ Public/private messages are separated
+ More documentation/examples for deities
+ Sample scripts to assist deities in running games
+ Transfer kit for moving games between dissimilar machines
+ Documentation updated to reflect all changes
+ Many other minor improvements/changes

Limits: 256 players, 1024x1024 world

Name: BSD Empire

History: Starting from BSD *Empire* 1.1.5, Dave Pare has continued to evolve his very popular concept of *Empire*. His latest version eliminates many micromanagement aspects of the game and provides a binary-only client interface to the *empire* server.

Features:
+ Multiplayer, hexmap, InterNet-server-based
+ Planes, nukes, satellites, ships, market, distribute
+ Screen-based standard client with TCL and built-in database
+ Fixed update times
+ Military effectiveness
+ Behind-the-scenes market
+ Military defense pacts
+ Actively supported, but still in early release stages

Limits: 256 players, 1024x1024 world

OS required: BSD, SunOS [34].*, HP-UX, Domain 10.2, AIX 2.2.1, Ultrix, DYNIX

Name: PSL Empire

History: Written by Peter Langston long ago. This is the version of *empire* that started it all. It was distributed in binary form for many years. A few files are missing from this copy.

Features:
+ Multiplayer
+ Individual updates
+ Ships
+ Hexmap

Limits: 32 players, 128x128 world

OS required: Unix

Name:	Old Empire
History:	Is based on Tom Fisher's decompilation, porting, and extensive bug-fixing of an OLD (1978) 11/70 PSL *Empire*. Still played actively by those preferring simpler game.
Features:	+ Multiplayer
	+ Individual updates
	+ Plane (one type) and ships
	+ Square map
	+ Simple (no oil, food, morale, nukes, light/heavy industry)
OS required:	Unix
Limits:	32 countries; 128x128; 32,767 ships
Name:	Amiga Empire
History:	It started with Chris Gray playing PSL *Empire* many years ago. He decided to reimplement it for the Amiga, based on the docs. This is the promised new version, updated by Dave Wright.
Features:	+ Multiplayer
	+ Individual update times
	+ Planes, ships, news, etc.
	+ Graphical front end for Amiga platform
	+ Compatible with Amiga multiuser BBS systems
Limits:	44 players, 256x256 world, square power-of-two world. Simultaneous players limited only by the number of ports.
OS required:	AmigaDos, 1.2 or higher. 512K RAM needed, more is better
Name:	GS Empire for the PC
History:	Based on his experience with PSL-derived Unix *empire*s, Gordon Storga wrote a PC version of *empire*. It is now available as shareware ($20). A network (LAN) version is planned.
Features:	+ Multiplayer (though not simultaneous)
	+ Various units and sector types
	+ Commodities market
	+ Screen based
Limits:	7 players, 96x96 world
OS required:	MS DOS on PC, XT, 286, 386, clones
Name:	C Empire
History:	based on the VMS *Empire*, Chuck Simmons recoded in C.
Features:	+ Single player
	+ Rectangular map

OS required:	Unix
Name:	VMS Empire
History:	Written by Walter Bright (bright@dataio.data-io.com)
Features:	+ single player
	+ Screen-based interface
	+ Written in FORTRAN
OS required:	VMS
Name:	Empire Master
History:	Development started by accident. Was originally called "*Empire* Builder," but that infringed on another's trademark. The implementation is not based on any previous code. Source is not available.
Features:	+ Technology levels and supplies
	+ 16 unit types (nukes, missiles, fuel)
	+ Fancy, programmable, scalable, windowed interface
	+ Auto-explore, auto-patrol, independent distribution paths
	+ Optimized for playing strategy, not micromanagement
Limits:	2 players, 255x255 world
OS required:	Macintosh, System 7, and Appletalk required for two machine play
Name:	Empire "Wargame of the Century"
How to get:	Buy it.
History:	A commercial game based on Walter Bright's work. Improved by Mark Baldwin. Very similar to VMS *Empire*. Published by Interstel; distributed by Electronic Arts.
Features:	+ Multiplayer (not simultaneous)
	+ Square map
	+ Very simple (6 ships, 1 land unit, 1 plane, no economy)
	+ Decent computer players
Limits:	3 players (any combo of human and computer)
OS required:	MS DOS, Atari ST, Amiga, Apple II
Name:	Xerox Development Environment (XDE) Empire
History:	Leif Bennett took a Unix version and ported it to XDE.
Features:	+ Multiplayer
	+ Fixed update times
	+ InterNet-server-based
	+ Planes, ships, market, distribute
	+ Square map
	+ Actively supported

	+ A complete window environment
	+ All commands are available by clicking with mouse
Limits:	128 players, 256x256 world
OS required:	Currently only runs on Xerox workstations

Making It All Legal

Empire was never 'bought.' Walter Bright designed and copyrighted the original text-based game back in 1977. I was brought in during 1987 to completely redesign and rewrite it for commercial release. This created a new work, jointly owned by myself and Walter, which was then licensed to Interstel for publication. At no time have the game rights been 'sold.'

"In the case of *Empire Deluxe*, both Walter and myself have contracted our rights to White Wolf Productions such that White Wolf could write *Empire Deluxe*. (Note the legal-base-touching here: although I work for and own a substantial part of White Wolf, and I coauthored *Empire Deluxe* for White Wolf, White Wolf still had to contract with Mark Baldwin to access my previously created intelectual property.)

Again, although New World Computing published the game (and it is being distributed by Broderbund), they did not 'buy' it, but only licensed it for publication.

—Mark Baldwin

The original, boxed version of *Empire* was written by Walter Bright between 1976 and 1979 while he attended Caltech. In its first incarnation, it was written in FORTRAN for the VAX computer that the Institute possessed. Later, mainframe versions included the PDP-11 and the LSI 11 translations of *Empire*. Naturally, the average person had little access to a mainframe computer (and even less for playing games on them), so it came to pass in 1984 that a version of *Empire* was released commercially for the IBM PC. This version (1.0) was marketed by Northwest Software for the next few years and began to establish *Empire* as something of a "cult" computer game.

"*Empire* v2.xx, which was published by Interstel, was maybe 75 percent my code and design while the other 25 percent was Walter Bright's. I'm not sure that I would call *Empire Deluxe* an upgrade, however, since it is //much// more than that. There is not a speck of code from the original *Empire* game in *Empire Deluxe*. And, while *Empire* took up about 250k of disk space, *Empire Deluxe*['s] is about 4 Meg!"

—Mark Baldwin

In 1987, a Texas-based company called Interstel decided to publish a more commercial version of the game. Interstel hired NASA veteran Mark Baldwin to do a major rewrite of the code and do some additional design work. Designated officially as Version 2.0x, this new version of *Empire* was first programmed for the Atari ST computer, and, while there were little changes to the game rules themselves (although

Mark prevented armies from being allowed to move into the sea and automatically die), he did much to enhance the game's general interface. In particular, Mark added a mouse, menus, and additional support orders to the original text/keyboard-only interface. From this first incarnation were developed all future versions of *Empire: Wargame of the Century*. It should be noted that all three of these versions of *Empire* were approximately one megabyte in size.

Interstel-lar Performance

Interstel was the company that released all these various versions of *Empire* from 1987 through 1991. Dr. Trevor Sorenson of Interstel saw a magazine review of Walter's Version 1.0 of the game in 1984 and approached Walter Bright in 1985 about publishing a personal-computer version of the game. Bright was already committed to a commercial distribution deal with Epyx at the time. Epyx, however, failed to release the product, so, in 1986, the rights reverted to Mr. Bright and the deal with Interstel was made.

Empire was originally envisioned as the "planetary combat resolution" system for their Star Fleet family of games (elaborating on one method of planetary conquest found in both Star Fleet II and Star Fleet III; games that, alas, never achieved the same phenomenal success that *Empire* did). Figure A.4 is a page from the *Empire* manual, setting the scenario and giving the players their *orders* for conducting operations.

Interestingly, Trevor Sorensen of Super Nova Creations, who did most of the original programming for the *Star Fleet* games (except *Empire*), has been working with Mindcraft to create their *Star Legions* game, a '90s continuation of his older works. Mindcraft also plans to release Star Fleet III in 1993.

STAR FLEET HEADQUARTERS
UNITED GALACTIC ALLIANCE

From: Grand Admiral Trevor C. Sorensen
Commander-In-Chief
Star Fleet Command

To: Captain William P. Brown
Captain, U.G.A.S. *Britannia*

Re: **OPERATION BIG BROTHER**
Security Classification: **TOP SECRET**

The Krellan Empire is invading Alliance space at an alarming rate and ravaging all the helpless planets in their path. Due to the vastness of the territory invaded, even the mighty Krellan Empire does not have enough warriors for full planetary assaults on each and every planet. Thus, the Krellans have developed OPERATION BIG BROTHER. Its purpose is to subdue and conquer the low to medium technology planets, which the Krellans can accomplish with minimum forces. A Krellan battle cruiser or troop transport teleports down one or two strategy and production team(s) to the largest and strongest city on the planet, and installs one of their generals as emperor. With the introduction of some advanced technology, but using the planet's own resources and manpower, they begin their conquest of the planet. After this *planetary empire* has been established, they hand the planet over to the Krellan Empire.

The United Galactic Alliance is even more sorely pressed than the Krellans for manpower and resources. It will be a great struggle to counter this new Krellan threat.

Therefore, you, Captain William P. Brown, and your crew of the U.G.A.S. *Britannia*, are hereby assigned to patrol the region of Alliance space as outlined in Attachment 1, and intercept as many Krellan vessels as possible in an attempt to stop Operation Big Brother. You are to avoid detection by any Krellan forces. Your ship will contain a number of Alliance advisory teams, each with its own General Officer in command. You are to send one team to each Krellan invaded planet to try to unite the fractionalized cities. Your team will form a counter empire to stop and defeat the growing Krellan planetary empire. Once the Krellan threat has been eliminated, the Alliance will convert the planet to a democratic government.

Although I was an author of *Star Fleet II*, it was only for the planetary invasion modules of the game (which have just been rewritten and rereleased as *Star Legions*). Since I didn't see any real need to keep the Star Fleet universe connection for *Empire Deluxe*, I didn't.

—Mark Baldwin

The Quiet Pirates

The old *Empire* information screen is shown in the following illustration. There is a lecture from Mark Baldwin in the text about pirating. This is quite a problem for a game as popular as *Empire*. It is interesting to note here that *Empire* may also be one of the most pirated games of all time. Until a few years ago, Interstel admitted that only 60,000 units of the game had been sold on all formats. Yet, some sources suggest that over 50,000 units were sold on the IBM format alone. Certainly, more than 100,000 gamers claim to have a copy of *Empire*, and they have enjoyed untold hours playing it.

REVIVAL DELUXE

Many companies tried to make offers to acquire the rights to *Empire* from Interstel during the late 1980s and early 1990s. New World Computing, in particular, even had a "deal on the table and the check made out." However, Interstel was undergoing some serious business difficulties, and, according to New World, no one could be found at Interstel with the authority to sign the contract! In 1992, the rights to *Empire* reverted from Interstel back to Walter Bright (who had the Version 1.0 rights) and Mark Baldwin (for the rights to his additions made in the 2.0x versions). Walter and Mark, in turn, licensed their rights to *Empire* to a computer-game-programming house, White Wolf Productions (a Colorado corporation).

Wise Wolf

Two of White Wolf's principals are Mark Baldwin (by a strange coincidence, the same Mark Baldwin who did the 2.0x versions of *Empire*) and Bob Rakosky (another praiseworthy programmer who became involved with *Empire* beginning with its Amiga conversion in 1988). This White Wolf team of "Mark and Bob" were behind the hit QQP wargame, The Perfect General. The interface they created for that game, in particular, bears a very similar look and feel to the one used in *Empire Deluxe*.

After getting the license to *Empire*, White Wolf had to decide what to do with it. Naturally, the plan was made to bring the game up to 1990s

standards and then find the right publisher for it.

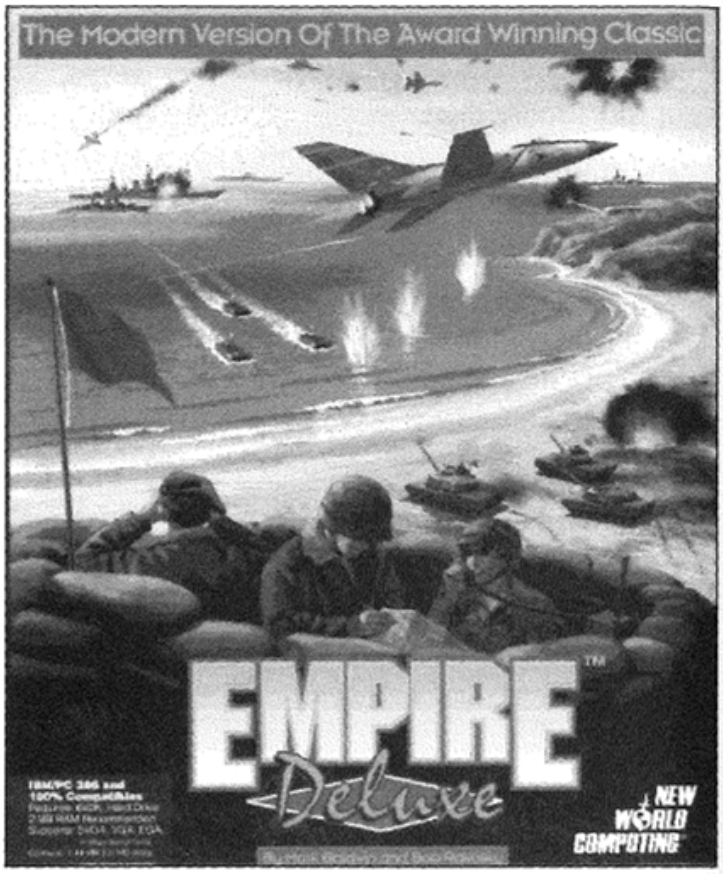
"We've put a lot of effort into designing this game so that it appeals both to the hardcore strategy-gamer players who are already familiar with the original *Empire*, as well as the many other potential players who have not yet experienced the 'I'll just play a couple of more turns' that ends up an all-nighter. As our beta-test manager will readily admit, this will be the game to use to convince your role-playing-game-fanatic friends that non-RPGs can be fun, too!"

—Bob Rakosky

First, however, a philosophical decision had to be made. *Empire* was one of the few "sacred games" in the computer gaming community. The core elements of its design had allowed it to withstand the test of time in the rapidly changing computer-game marketplace. It is a game that is so playable that it never seems to disappear from gamer's hard drives. How much of this game should be changed in any new version of *Empire*?

While Mark has in possession stacks of mail received over the years with suggestions from *Empire* enthusiasts for improving the game, would it be right to throw out a classic like *Empire*? Many suggestions were worthy of inclusion in a new version, but implementing them might mean overshadowing the essential appeal of its straightforward design. It wasn't an easy task to try to fulfill all of the great expectations built up over time from the large cult of fans of the original *Empire*.

No, that would simply not do. The integrity of *Empire* had to be maintained, so a major redesign would have to wait. Instead of a complete overhaul, a different package (as shown in the following illustration) was envisioned. It would present players with the first three rungs on a ladder that would scale *Empire*'s future. Entitled *Empire Deluxe*, it would incorporate a state-of-the-art graphics look to it and add sound support and the trademark White Wolf interface. More players, modem support, some automated commands, and a powerful scenario editor were also featured improvements.



"We added new rules to the Advanced Game in a very selective manner. In other words, each rules addition had to add a great deal to the game. The reason behind this was that I still wanted a very clean game, even when playing by the Advanced Game rules. Adding things like machine gunners would have added much more complexity than value in my humble opinion."

—Mark Baldwin

From a game playing standpoint, however, *Empire Deluxe* would be three games in one. The first was an introductory level of the basic *Empire* game, designed to ease new players into its wonders. The second tier remained, essentially, "good old" *Empire*—unaltered save for the '90s face-lift. The third level in *Empire Deluxe* was an advanced game that added two new unit types (armor and bombers), terrain effects, and production variables. Thus, the philosophical decision as to the immediate future of *Empire* was made. Now White Wolf had to find the right publisher.

New World to Conquer

The search for a publisher and a platform was extensive. Before the deal was done, White Wolf had tried to get licensing deals for *Empire* versions on everything from the Nintendo to the Sharp Wizard. Eventually, White Wolf ended up selecting New World Computing in Woodland Hills, California, to publish their *Empire Deluxe* game (which is ironic, considering how close New World Computing had previously been to purchasing the rights to *Empire* from Interstel). New World, while best known for their fantasy role-playing-game series *Might and Magic*, has as its guiding force Jon van Caneghem. Jon is a long-time board-gamer, with deep roots in paper war and strategy games. New World Computing had slowly been moving more in the direction of supporting a strategy game line as they added titles like *King's Bounty*, *Nuclear War*, and *Spaceward, Ho!* to their product line. By publishing *Empire Deluxe*, New World is teaming up with a flagship strategy gaming product.

It was a classic case of "who you know." Mark Baldwin and Jon Van Caneghem frequently talked at the game developer's conferences held each year in the San Francisco Bay Area of California. When Mark called Jon one day and said that rights reverted to him, Jon suggested that he was still very much interested in publishing a revised *Empire*. The two friends easily negotiated a deal, and, voila, *Empire Deluxe* went into production and was published in early 1993.

Forging New *Empires*?

With the release of *Empire Deluxe*, White Wolf and New World are presently gauging demand for possible sequel games. Scenario disks, of course, with new maps and battle situations presented (and possibly designed by dedicated players through the scenario builder provided with the game), are a natural. The first of any sequels would, presumably, be titled *Empire* II and, in all likelihood, incorporate many dedicated player's suggestions that Mark Baldwin has been faithfully collecting over the past several years. Paratroops? Technology levels? Road and bridge building? Are these some ideas that might take root in the possible release of *Empire II*?

Time will tell, and the authors of this book will be there to cover it should it occur.

THE MARK AND BOB SHOW

After completing the original Atari ST version of *Empire* 2.0x in 1987, Mark started looking for someone to code the Amiga conversion of the game. Mark was dragged (kicking and screaming, as the story goes) to a local Amiga-users group. There, he was first introduced to Bob Rakosky by a mutual acquaintance who was also present. At the time, Bob had just published his first commercial program for the Amiga (a hard disk backup utility) and was looking for a new project. The two eventually struck up a deal, and Bob contracted with Interstel to do the project.

Around 1989, it was becoming rapidly

apparent to both Mark and Bob that the days of the lone-wolf computer-game designer were all but over. The cost to produce a competitive game in the marketplace had exceeded the resources of most individuals who had to work for a living. Since they had worked successfully together on *Empire* and on converting D.R.A.G.O.N. Force to the Amiga, both agreed that forming a partnership/design team was the best way to survive the times. With a third investor, White Wolf Productions was formed and incorporated with the goal of producing high-quality entertainment software. Their first corporate project was *The Perfect General* (although the game's working title was "Challenge") and, after the publication of that game and its World War II scenario disk, Mark and Bob set to create *Empire Deluxe*.

THE END OF THE BEGINNING

Empire Deluxe (3.0) is the 1990s update of the classic computer strategy game, *Empire*. Few, if any, currently popular computer games can trace their copyright date back to 1977, and fewer still have such a large following of regular players. *Empire Deluxe* seems to have an ever-extending "game life" that probably will survive us all.

> We called *Empire Deluxe* verions 3.0 to avoid any chance of confusion with the old *Empire* 2.0 series.
>
> —Mark Baldwin

Table A.1 gives a brief synopsis for ecperienced *Empire* players of the changes made in *Empire Deluxe*.

TABLE A.1: CHANGES MADE FROM *EMPIRE* (2.X) TO *EMPIRE DELUXE* (3.0)

General Changes:

- Improved graphics and sound support.
- Up to six players are allowed, maximum, per game, each with a choice of the six different player colors available.
- Modem- and network-play features have been added to the enhanced play-by-email feature.
- The old "slider bars" for adjusting player combat and production handicaps have been replaced with buttons that allow for fixed, negative handicaps only. (The new version, 3.01, has added advantages.)
- A complete scenario-builder has been added. It can even edit maps from the old *Empire* game and save them as *Empire Deluxe* maps.
- The map may be of variable size now, from 20x20 to 200x150 (except under the Basic Game rules).

- Maps may now "wrap" from east-to-west, and thus are cylindrical.
- Maps have the following new terrain types: forest, rough, mountain, and river. Except when using the Advanced Game rules, these new terrain types act the same as clear.
- However, scenarios can no longer be played from a randomly picked, saved map.

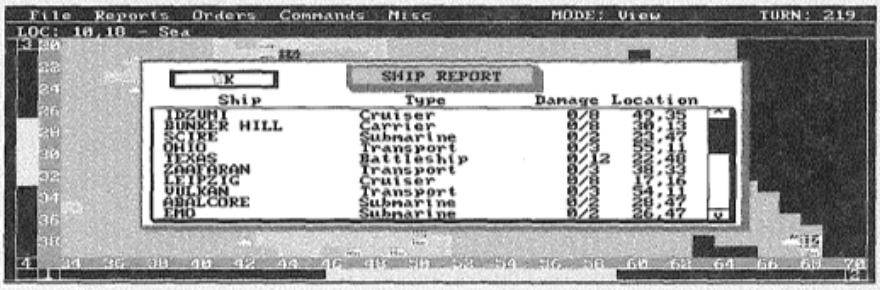


Figure A.6 An old *Empire* Ship Report.

- Every unit and city can be renamed at any time during the game.
- However, there are no longer player Ship Reports, as shown in Figure A.6.
- An improved Path feature allows players to preset movement paths for any and all unit types between points (greatly enhancing the old Flight Paths).
- New unit movement orders, Auto Explore and Patrol, have been added, and the old Random Movement order has been removed.
- Transports set to Patrol between ports automatically convoy land units from the first port on their route and drop them off at the second.
- Aircraft may fly over friendly units but must end their turn "stacked" normally.
- Cities may be placed in a No-Production mode.
- Old unit sightings of enemy units have their backgrounds blackened after one turn and are cleared from the map after three turns.
- A new rank and promotion system has been added to enhance winners' reputations.

The Basic Game Rules:

- The map size is fixed at 50x50 squares.
- All units and terrain are always visible.
- Only the following units are available: armies, transports, destroyers, cruisers, and battleships.

The Advanced Game Rules:

- The army-unit type is replaced with the infantry-unit type, and a new armored unit type has been added. Infantry has the same characteristics as armies. Armored units have the

following characteristics: they have a movement of two; they spend two moves to enter river, rough, or forest terrain; they cannot move into but may attack units on mountains; they attack with 1/2 strength against defenders in river, forest, and mountain; they require two hits to destroy; if they capture a city while at full strength, an infantry unit is generated in their place; they take up two spaces aboard transports; and they require 12/10 turns to produce under normal (100-percent efficient) circumstances.

- The aircraft-unit type is replaced with the fighter-unit type, and a new bomber-unit type has been added. Both aircraft types will see and be seen at a range of two. Both types may attack enemy cities (units and productions), with fighters doing so at 1/2 strength. Fighters now have a speed of 6 and a range of 18. Bombers have the following characteristics: a speed of 4 and a range of 24; they may not land on aircraft carriers; they inflict two damage per hit.
- A new unit type has been introduced, the airbase. It is not be constructed by cities, but is converted from an existing infantry or armored unit by using the unload command. Its defense and sighting abilities are the same as a city, and it may hold an unlimited number of aircraft.
- Cities and aircraft sight a range of two.
- An economic model of variable production efficiencies has been built into the game. A city's production efficiency decreases when it is hit by enemy bombers or captured, and increases when it is set to No Production. A player's overall economic efficiency might drop if he has too many units and not enough cities, in general, to "support" them.

One-on-One Battle Results Tables

Each following page in this appendix presents a set of three tables with the outcomes of various combat resolutions. The header information at the top of each table shows an icon of the single-unit type that is attacking (with its current-damage level superimposed over it). The information to the right of that icon includes the attacking unit's current damage and other factors influencing combat.

Down the middle of each table is every defending-unit type and damage level (the minus numbers) that it is possible for the attacking unit to engage in combat. On either side of the defending unit type is a row of numbers, each representing a percentage chance. (If it helps you to visualize this, think of each number as having a percent sign after it.)

WHAT THE NUMBERS MEAN

The string of numbers to the left of the defending unit type are the percentages of the *attacking* unit (i.e., the one pictured at the top of the table) winning. The column headings above these numbers, shown as negative numbers, indicate the amount of damage *suffered* by the attacking unit while winning the battle. Similarly, to the right of the *defending* unit type, are the percentages of the defending unit (i.e., the one listed in the center of the row) winning. The column headings above these numbers show the amount of damage *inflicted* by the attacking unit while losing the battle.

In the center of each row, of course, is the defending unit type. The number immediately to its left is the *attacker's* gross percentage chance of winning the battle. The number immediately to its right is the defender's gross percentage chance of winning the battle. Notice that this is the total of the other percentage outcomes further to the left and right and that, when you add the left and right side percentages together, you always get 100 percent.

HOW THE NUMBERS WERE CALCULATED

These tables show the various end results of a battle only. This means after all of the *minirounds* have been fought. The formulae used to make these calculations are found on the tables presented in Chapter 9.

Notes

No combat handicaps have been applied to either side in calculating the results of these tables. (Each derivation of handicaps would have required another set of these tables and could have, by themselves, entirely filled another book.)

Most of the total chances of winning have been rounded to the nearest whole number. The only exception was when the odds were 12.5 and 87.5, in which case they rounded to 12 and 88, respectively. To make sure that all the partial damage probabilities sum to the smooth total of 100 percent, there was some small fudging of their rounding off. The dividing point between rounding up and rounding down was shifted between .3 and .7 as necessary. For example when the two partial probabilities were 1.3 and .35, the sum is 1.65, which rounds up to 2, so the two partials got rounded to 1 and 1, respectively.

TABLE B.1: INFANTRY UNIT ATTACKING

Damage = 0/1 Attack = 2
Shot Damage = 1 Defense = 2*
* = 1 versus bombardment attacks

0	ATTACKING INFANTRY WINS	DEF.-UNIT TYPE	DEF. UNIT WINS	PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE INFLICTED 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
50	50	infantry&	50	50											
25	25	armor	75	50	25										
50	50	armor-1	50	50											
50	50	fighter	50	50											
67	67	bomber	33	33											
30	30	transport	70	33	22	15									
45	45	transport-1	55	33	22										
67	67	transport-2	33	33											
12	12	destroyer	88	50	25	13									
25	25	destroyer-1	75	50	25										
50	50	destroyer-2	50	50											

& = either an infantry unit, city, or air base.

0	ATKR. WINS	DEF. TYPE	WINS	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	carrier	100	50	25	13	6	3	2	1	0				
1	1	carrier-1	99	50	25	12	6	3	2	1					
2	2	carrier-2	98	50	25	12	6	3	2						
3	3	carrier-3	97	50	25	13	6	3							
6	6	carrier-4	94	50	25	13	6								
12	12	carrier-5	88	50	25	13									
25	25	carrier-6	75	50	25										
50	50	carrier-7	50	50											
0	0	cruiser	100	50	25	13	6	3	2	1	0				
1	1	cruiser-1	99	50	25	12	6	3	2	1					
2	2	cruiser-2	98	50	25	12	6	3	2						
3	3	cruiser-3	97	50	25	13	6	3							
6	6	cruiser-4	94	50	25	13	6								
12	12	cruiser-5	88	50	25	13									
25	25	cruiser-6	75	50	25										
50	50	cruiser-7	50	50											

0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	battleship	100	50	25	13	6	3	2	1	0	0	0	0	0
0	0	battleship-1	100	50	25	13	6	3	2	1	0	0	0	0	
0	0	battleship-2	100	50	25	13	6	3	2	1	0	0	0		
0	0	battleship-3	100	50	25	13	6	3	2	1	0	0			
0	0	battleship-4	100	50	25	13	6	3	2	1	0				
1	1	battleship-5	99	50	25	12	6	3	2	1					
2	2	battleship-6	98	50	25	12	6	3	2						
3	3	battleship-7	97	50	25	13	6	3							
6	6	battleship-8	94	50	25	13	6								
12	12	battleship-9	88	50	25	13									
25	25	battleship-10	75	50	25										
50	50	battleship-11	50	50											

Table B.2: Armor Unit Attacking

Damage = ½ Attack = 2
Shot Damage = 1 Defense = 2*
* = 1 versus bombardment attacks

-1	0	Attacking Infantry Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
25	50	75	infantry&	25	25											
22	33	55	infantry*	45	45											
25	25	50	armor	50	25	25										
25	50	75	armor-1	25	25											
14	11	25	armor+	75	45	30										
22	33	55	armor-1+	45	45											
25	50	75	fighter	25	25											
50	50		bomber	50	50											
30	30	60	transport	40	11	14	15									
30	45	75	transport-1	25	11	14										
22	67	89	transport-2	11	11											
19	12	31	destroyer	69	25	25	19									
25	25	50	destroyer-1	50	25	25										
25	50	75	destroyer-2	25	25											

& infantry/city/air base
* infantry in forest, river, or mountains
+ armor in forest or river

-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
2	0	2	carrier	98	25	25	19	12	8	4	3	2				
3	1	4	carrier-1	96	25	25	19	12	8	4	3					
5	1	6	carrier-2	94	25	25	19	12	8	5						
8	3	11	carrier-3	89	25	25	19	12	8							
13	6	19	carrier-4	81	25	25	19	12								
19	12	31	carrier-5	69	25	25	19									
25	25	50	carrier-6	50	25	25										
25	50	75	carrier-7	25	25											
	0	0	cruiser	100	50	25	13	6	3	2	1	0				
	1	1	cruiser-1	99	50	25	12	6	3	2	1					
	2	2	cruiser-2	98	50	25	12	6	3	2						
	3	3	cruiser-3	97	50	25	13	6	3							
	6	6	cruiser-4	94	50	25	13	6								
	12	12	cruiser-5	88	50	25	13									
	25	25	cruiser-6	75	50	25										
	50	50	cruiser-7	50	50											

-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
	0	0	battleship	100	50	25	13	6	3	2	1	0	0	0	0	0
	0	0	battleship-1	100	50	25	13	6	3	2	1	0	0	0	0	
	0	0	battleship-2	100	50	25	13	6	3	2	1	0	0	0		
	0	0	battleship-3	100	50	25	13	6	3	2	1	0	0			
	0	0	battleship-4	100	50	25	13	6	3	2	1	0				
	1	1	battleship-5	99	50	25	12	6	3	2	1					
	2	2	battleship-6	98	50	25	12	6	3	2						
	3	3	battleship-7	97	50	25	13	6	3							
	6	6	battleship-8	94	50	25	13	6								
	12	12	battleship-9	88	50	25	13									
	25	25	battleship-10	75	50	25										
	50	50	battleship-11	50	50											

TABLE B.3: ARMOR UNIT WITH 1 DAMAGE ATTACKING

Damage = 1/2 Attack = 1+
Shot Damage = 1 Defense = 2*
* = 1 versus bombardmentattacks
+ = crippled

Attacking Infantry 0	Attacking Infantry Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
33	33	infantry&	67	67											
20	20	infantry*	80	80											
11	11	armor	89	67	22										
33	33	armor-1	96	67											
4	4	armor+	96	80	16										
20	20	armor-1+	80	80											
33	33	fighter	67	67											
33	33	bomber	67	67											
12	12	transport	88	50	25	13									
25	25	transport-1	75	50	25										
50	50	transport-2	50	50											
4	4	destroyer	96	67	22	7									
11	11	destroyer-1	89	67	22										
33	33	destroyer-2	67	67											

& infantry/city/air base
* infantry in forest, river, or mountains
+ armor in forest or river

Atkr. 0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	carrier	100	67	22	7	3	1	0	0	0				
0	0	carrier-1	100	67	22	7	3	1	0	0					
0	0	carrier-2	100	67	22	7	3	1	0						
0	0	carrier-3	100	67	22	7	3	1							
1	1	carrier-4	99	67	22	7	3								
4	4	carrier-5	96	67	22	7									
11	11	carrier-6	89	67	22										
33	33	carrier-7	67	67											
0	0	cruiser	100	67	22	7	3	1	0	0	0				
0	0	cruiser-1	100	67	22	7	3	1	0	0					
0	0	cruiser-2	100	67	22	7	3	1	0						
0	0	cruiser-3	100	67	22	7	3	1							
1	1	cruiser-4	99	67	22	7	3								
4	4	cruiser-5	96	67	22	7									
11	11	cruiser-6	89	67	22										
33	33	cruiser-7	67	67											

0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	battleship	100	67	22	7	3	1	0	0	0	0	0	0	0
0	0	battleship-1	100	67	22	7	3	1	0	0	0	0	0	0	
0	0	battleship-2	100	67	22	7	3	1	0	0	0	0	0		
0	0	battleship-3	100	67	22	7	3	1	0	0	0	0			
0	0	battleship-4	100	67	22	7	3	1	0	0	0				
0	0	battleship-5	100	67	22	7	3	1	0	0					
0	0	battleship-6	100	67	22	7	3	1	0						
0	0	battleship-7	100	67	22	7	3	1							
1	1	battleship-8	99	67	22	7	3								
4	4	battleship-9	96	67	22	7									
11	11	battleship-10	89	67	22										
33	33	battleship-11	67	67											

Table B.4: Fighter Unit Attacking

Damage = 0/1 Attack = 2
Shot Damage = 1 Defense = 2

0	Attacking Infantry Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
50	50	infantry[&]	50	50											
33	33	infantry[*]	67	67											
33	33	bomb city	67	67											
25	25	armor	75	50	25										
50	50	armor-1	50	50											
11	11	armor[+]	89	67	22										
33	33	armor-1[+]	67	67											
50	50	fighter	50	50											
67	67	bomber	33	33											
45	45	submarine	55	33	22										
67	67	submarine-1	33	33											
30	30	transport	70	33	22	15									
45	45	transport-1	55	33	22										
67	67	transport-2	33	33											
12	12	destroyer	88	50	25	13									
25	25	destroyer-1	75	50	25										
50	50	destroyer-2	50	50											

[&] infantry/air base
[*] infantry in forest or mountains
[+] armor in forest

0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	carrier	100	50	25	13	6	3	2	1	0				
1	1	carrier-1	99	50	25	12	6	3	2	1					
2	2	carrier-2	98	50	25	12	6	3	2						
3	3	carrier-3	97	50	25	13	6	3							
6	6	carrier-4	94	50	25	13	6								
12	12	carrier-5	88	50	25	13									
25	25	carrier-6	75	50	25										
50	50	carrier-7	50	50											
0	0	cruiser	100	50	25	13	6	3	2	1	0				
1	1	cruiser-1	99	50	25	12	6	3	2	1					
2	2	cruiser-2	98	50	25	12	6	3	2						
3	3	cruiser-3	97	50	25	13	6	3							
6	6	cruiser-4	94	50	25	13	6								
12	12	cruiser-5	88	50	25	13									
25	25	cruiser-6	75	50	25										
50	50	cruiser-7	50	50											

0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	battleship	100	50	25	13	6	3	2	1	0	0	0	0	0
0	0	battleship-1	100	50	25	13	6	3	2	1	0	0	0	0	
0	0	battleship-2	100	50	25	13	6	3	2	1	0	0	0		
0	0	battleship-3	100	50	25	13	6	3	2	1	0	0			
0	0	battleship-4	100	50	25	13	6	3	2	1	0				
1	1	battleship-5	99	50	25	12	6	3	2	1					
2	2	battleship-6	98	50	25	12	6	3	2						
3	3	battleship-7	97	50	25	13	6	3							
6	6	battleship-8	94	50	25	13	6								
12	12	battleship-9	88	50	25	13									
25	25	battleship-10	75	50	25										
50	50	battleship-11	50	50											

TABLE B.5: BOMBER UNIT ATTACKING

Damage = 0/1 Attack = 2*
Shot Damage = 2 Defense = 2*
* = 1 versus fighters

Attacking Bomber Wins 0	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-2	-4	-6	-8	-10
50 50	bomb city	50	50					
50 50	infantry&	50	50					
33 33	infantry*	67	67					
50 50	armor	50	50					
50 50	armor-1	50	50					
33 33	armor+	67	67					
33 33	armor-1+	67	67					
33 33	fighter	67	67					
50 50	bomber	50	50					
67 67	submarine	33	33					
67 67	submarine-1	33	33					
45 45	transport	55	33	22				
67 67	transport-1	33	33					
67 67	transport-2	33	33					
25 25	destroyer	75	25	50				
50 50	destroyer-1	50	50					
50 50	destroyer-2	50	50					

& infantry/air base
* infantry in forest or mountains
+ armor in forest

Atkr. 0 Wins	Type	Def. Wins	0	-2	-4	-6	-8	-10
6 6	carrier	94	50	25	13	6		
6 6	carrier-1	94	50	25	13	6		
12 12	carrier-2	88	50	25	13			
12 12	carrier-3	88	50	25	13			
25 25	carrier-4	75	50	25				
25 25	carrier-5	75	50	25				
50 50	carrier-6	50	50					
50 50	carrier-7	50	50					
6 6	cruiser	94	50	25	13	6		
6 6	cruiser-1	94	50	25	13	6		
12 12	cruiser-2	88	50	25	13			
12 12	crusier-3	88	50	25	13			
25 25	cruiser-4	75	50	25				
25 25	cruiser-5	75	50	25				
50 50	cruiser-6	50	50					
50 50	cruiser-7	50	50					

0	Atkr. Wins	Type	Def. Wins	0	-2	-4	-6	-8	-10
2	2	battleship	98	50	25	12	6	3	2
2	2	battleship-1	98	50	25	12	6	3	2
3	3	battleship-2	97	50	25	13	6	3	
3	3	battleship-3	97	50	25	13	6	3	
6	6	battleship-4	94	50	25	13	6		
6	6	battleship-5	94	50	25	13	6		
12	12	battleship-6	88	50	25	13			
12	12	battleship-7	88	50	25	13			
25	25	battleship-8	75	50	25				
25	25	battleship-9	75	50	25				
50	50	battleship-10	50	50					
50	50	battleship-11	50	50					

Table B.6: Transport Unit Attacking

Damage = 2/3 Attack = 1
Shot Damage = 1 Defense = 1

-2	-1	0	Attacking Transport Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
15	22	33	70	fighter	30	30											
22		33	55	bomber	45	45											
		25	25	submarine	75	50	25										
		50	50	submarine-1	50	50											
19	19	12	50	transport	50	12	19	19									
19	25	25	69	transport-1	31	12	19										
13	25	50	88	transport-2	12	12											
10	7	3	20	destroyer	80	30	30	20									
15	14	11	40	destroyer-1	60	30	30										
15	22	33	70	destroyer-2	30	30											

-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	0	0	carrier	100	30	30	20	11	5	2	1	1				
1	0	0	1	carrier-1	99	30	30	20	11	5	2	1					
1	1	0	2	carrier-2	98	30	30	20	11	5	2						
3	1	0	4	carrier-3	96	30	30	20	11	5							
6	3	1	10	carrier-4	90	30	30	19	11								
10	7	3	20	carrier-5	80	30	30	20									
15	14	11	40	carrier-6	60	30	30										
15	22	33	70	carrier-7	30	30											
0		0	0	cruiser	100	45	30	15	6	3	1	0	0				
0		0	0	cruiser-1	100	45	30	15	6	3	1	0					
1		0	1	cruiser-2	99	45	30	15	6	2	1						
1		1	2	cruiser-3	98	45	30	15	6	2							
3		1	4	cruiser-4	96	45	30	15	6								
7		4	11	cruiser-5	89	45	29	15									
14		11	25	cruiser-6	75	45	30										
22		33	55	cruiser-7	45	45											

-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
		0	0	battleship	100	67	22	7	3	1	0	0	0	0	0	0	0
		0	0	battleship-1	100	67	22	7	3	1	0	0	0	0	0	0	
		0	0	battleship-2	100	67	22	7	3	1	0	0	0	0	0		
		0	0	battleship-3	100	67	22	7	3	1	0	0	0	0			
		0	0	battleship-4	100	67	22	7	3	1	0	0	0				
		0	0	battleship-5	100	67	22	7	3	1	0	0					
		0	0	battleship-6	100	67	22	7	3	1	0						
		0	0	battleship-7	100	67	22	7	3	1							
		1	1	battleship-8	99	67	22	7	3								
		4	4	battleship-9	96	67	22	7									
		11	11	battleship-10	89	67	22										
		33	33	battleship-11	67	67											

TABLE B.7: TRANSPORT UNIT WITH 1 DAMAGE ATTACKING

Damage = 1/3 Attack = 1
Shot Damage = 1 Defense = 1

		Attacking Transport	Def.- Unit	Def. Unit	Percentage Chance for This Amount of Damage Inflicted											
-1	0	Wins	Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
22	33	55	fighter	45	45											
	33	33	bomber	67	67											
	25	25	submarine	75	50	25										
	50	50	submarine-1	50	50											
19	12	31	transport	69	25	25	19									
25	25	50	transport-1	50	25	25										
25	50	75	transport-2	25	25											
7	4	11	destroyer	89	45	30	14									
14	11	25	destroyer-1	75	45	30										
22	33	55	destroyer-2	45	45											

		Atkr.	Def.													
-1	0	Wins	Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	0	carrier	100	45	30	15	6	3	1	0	0				
0	0	0	carrier-1	100	45	30	15	6	3	1	0					
1	0	1	carrier-2	99	45	30	15	6	2	1						
1	1	2	carrier-3	98	45	30	15	6	2							
3	1	4	carrier-4	96	45	30	15	6								
7	4	11	carrier-5	89	45	29	15									
14	11	25	carrier-6	75	45	30										
22	33	55	carrier-7	45	45											
	0	0	cruiser	100	67	22	7	3	1	0	0	0				
	0	0	cruiser-1	100	67	22	7	3	1	0	0					
	0	0	cruiser-2	100	67	22	7	3	1	0						
	0	0	cruiser-3	100	67	22	7	3	1							
	1	1	cruiser-4	99	67	22	7	3								
	4	4	cruiser-5	99	67	22	7									
	11	11	cruiser-6	89	67	22										
	33	33	cruiser-7	67	67											

-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
	0	0	battleship	100	67	22	7	3	1	0	0	0	0	0	0	0
	0	0	battleship-1	100	67	22	7	3	1	0	0	0	0	0	0	
	0	0	battleship-2	100	67	22	7	3	1	0	0	0	0	0		
	0	0	battleship-3	100	67	22	7	3	1	0	0	0	0			
	0	0	battleship-4	100	67	22	7	3	1	0	0	0				
	0	0	battleship-5	100	67	22	7	3	1	0	0					
	0	0	battleship-6	100	67	22	7	3	1	0						
	0	0	battleship-7	100	67	22	7	3	1							
	1	1	battleship-8	99	67	22	7	3								
	4	4	battleship-9	96	67	22	7									
	11	11	battleship-10	89	67	22										
	33	33	battleship-11	67	67											

Table B.8: Transport Unit with 2 Damage Attacking

Damage = 2/3 Attack = 1/2+
Shot Damage = 1 Defense = 1
+ crippled

0	Attacking Transport Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
20	20	fighter	80	80											
20	20	bomber	80	80											
11	11	submarine	89	67	22										
33	33	submarine-1	67	67											
4	4	transport	96	67	22	7									
11	11	transport-1	89	67	22										
33	33	transport-2	67	67											
1	1	destroyer	99	80	16	3									
4	4	destroyer-1	86	80	16										
20	20	destroyer-2	80	80											

0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	carrier	100	80	16	3	1	0	0	0	0				
0	0	carrier-1	100	80	16	3	1	0	0	0					
0	0	carrier-2	100	80	16	3	1	0	0						
0	0	carrier-3	100	80	16	3	1	0							
0	0	carrier-4	100	80	16	3	1								
1	1	carrier-5	99	80	16	3									
4	4	carrier-6	96	80	16										
20	20	carrier-7	80	80											
0	0	cruiser	100	80	16	3	1	0	0	0	0				
0	0	cruiser-1	100	80	16	3	1	0	0	0					
0	0	cruiser-2	100	80	16	3	1	0	0						
0	0	cruiser-3	100	80	16	3	1	0							
0	0	cruiser-4	100	80	16	3	1								
1	1	cruiser-5	99	80	16	3									
4	4	cruiser-6	96	80	16										
20	20	cruiser-7	80	80											

0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	battleship	100	80	16	3	1	0	0	0	0	0	0	0	0
0	0	battleship-1	100	80	16	3	1	0	0	0	0	0	0	0	
0	0	battleship-2	100	80	16	3	1	0	0	0	0	0	0		
0	0	battleship-3	100	80	16	3	1	0	0	0	0	0			
0	0	battleship-4	100	80	16	3	1	0	0	0	0				
0	0	battleship-5	100	80	16	3	1	0	0	0					
0	0	battleship-6	100	80	16	3	1	0	0						
0	0	battleship-7	100	80	16	3	1	0							
0	0	battleship-8	100	80	16	3	1								
1	1	battleship-9	99	80	16	3									
4	4	battleship-10	96	80	16										
20	20	battleship-11	80	80											

TABLE B.9: SUBMARINE UNIT ATTACKING

Damage = 0/2 Attack = 2*
Shot Damage = 3 Defense = 1
* = 1 versus fighters and bombers

		Attacking Submarine	Def Unit	Def. Unit	Percentage Chance for This Amount of Damage Inflicted			
-1	0	Wins	Type	Wins	0	-3	-6	-9
22	33	55	fighter	45	45			
	33	33	bomber	67	67			
	67	67	submarine	33	33			
	67	67	submarine-1	33	33			
22	67	89	transport	11	11			
22	67	89	transport-1	11	11			
22	67	89	transport-2	11	11			
25	50	75	destroyer	25	25			
25	50	75	destroyer-1	25	25			
25	50	75	destroyer-2	25	25			
-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
19	12	31	carrier	69	25	25	19	
19	12	31	carrier-1	69	25	25	19	
25	25	50	carrier-2	50	25	25		
25	25	50	carrier-3	50	25	25		
25	25	50	carrier-4	50	25	25		
25	50	75	carrier-5	25	25			
25	50	75	carrier-6	25	25			
25	50	75	carrier-7	25	25			
	12	12	cruiser	88	50	25	13	
	12	12	cruiser-1	88	50	25	13	
	25	25	cruiser-2	75	50	25		
	25	25	cruiser-3	75	50	25		
	25	25	cruiser-4	75	50	25		
	50	50	cruiser-5	50	50			
	50	50	cruiser-6	50	50			
	50	50	cruiser-7	50	50			

-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
	6	6	battleship	94	50	25	13	6
	6	6	battleship-1	94	50	25	13	6
	6	6	battleship-2	94	50	25	13	6
	12	12	battleship-3	88	50	25	13	
	12	12	battleship-4	88	50	25	13	
	12	12	battleship-5	88	50	25	13	
	25	25	battleship-6	75	50	25		
	25	25	battleship-7	75	50	25		
	25	25	battleship-8	75	50	25		
	50	50	battleship-9	50	50			
	50	50	battleship-10	50	50			
	50	50	battleship-11	50	50			

Table B.10: Submarine Unit with 1 Damage Attacking

Damage = 1 /2 Attack = 1+*
Shot Damage = 3 Defense = 1
+ = crippled
* = 1/2 versus fighters and bombers

0	Attacking Submarine Wins	Def Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-3	-6	-9
20	20	fighter	80	80			
20	20	bomber	80	80			
50	50	submarine	50	50			
50	50	submarine-1	50	50			
50	50	transport	50	50			
50	50	transport-1	50	50			
50	50	transport-2	50	50			
33	33	destroyer	67	67			
33	33	destroyer-1	67	67			
33	33	destroyer-2	67	67			

0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
4	4	carrier	96	67	22	7	
4	4	carrier-1	96	67	22	7	
11	11	carrier-2	89	67	22		
11	11	carrier-3	89	67	22		
11	11	carrier-4	89	67	22		
33	33	carrier-5	67	67			
33	33	carrier-6	67	67			
33	33	carrier-7	67	67			
4	4	cruiser	96	67	22	7	
4	4	cruiser-1	96	67	22	7	
11	11	cruiser-2	89	67	22		
11	11	cruiser-3	89	67	22		
11	11	cruiser-4	89	67	22		
33	33	cruiser-5	67	67			
33	33	cruiser-6	67	67			
33	33	cruiser-7	67	67			

0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
1	1	battleship	99	67	22	7	3
1	1	battleship-1	99	67	22	7	3
1	1	battleship-2	99	67	22	7	3
4	4	battleship-3	96	67	22	7	
4	4	battleship-4	96	67	22	7	
4	4	battleship-5	96	67	22	7	
11	11	battleship-6	89	67	22		
11	11	battleship-7	89	67	22		
11	11	battleship-8	89	67	22		
33	33	battleship-9	96	67			
33	33	battleship-10	96	67			
33	33	battleship-11	96	67			

TABLE B.11: DESTROYER UNIT ATTACKING

Damage = 0/3 Attack = 2*
Shot Damage = 1 Defense = 2
* = 1 versus fighters and bombers

			ATTACKING DESTROYER	DEF.- UNIT	DEF. UNIT	PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE INFLICTED									
-2	-1	0	WINS	TYPE	WINS	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
15	22	33	70	fighter	30	30										
22		33	55	bomber	45	45										
		45	45	submarine	55	33	22									
		67	67	submarine-1	33	33										
20	30	30	80	transport	20	3	7	10								
15	30	45	90	transport-1	10	3	7									
7	22	67	96	transport-2	4	4										
19	19	12	50	destroyer	50	12	19	19								
19	25	25	69	destroyer-1	31	12	19									
13	25	50	88	destroyer-2	12	12										

			ATKR.	DEF.												
-2	-1	0	WINS	TYPE	WINS	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
3	2	0	5	carrier	95	13	19	19	16	12	8	5	3			
5	3	1	9	carrier-1	91	12	19	19	16	12	8	5				
8	5	1	14	carrier-2	86	12	19	19	16	12	8					
12	8	3	23	carrier-3	77	12	19	19	16	12						
15	13	6	34	carrier-4	66	12	19	19	16							
19	19	12	50	carrier-5	50	12	19	19								
19	25	25	69	carrier-6	31	12	19									
13	25	50	88	carrier-7	12	12										
2		0	2	cruiser	98	25	25	19	12	8	5	3	1			
3		1	4	cruiser-1	96	25	25	19	12	8	4	3				
5		1	6	cruiser-2	94	25	25	19	12	8	5					
8		3	11	cruiser-3	89	25	25	19	12	8						
13		6	19	cruiser-4	81	25	25	19	12							
19		12	31	cruiser-5	69	25	25	19								
25		25	50	cruiser-6	50	25	25									
25		50	75	cruiser-7	25	25										

-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
		0	0	battleship	100	50	25	13	6	3	2	1	0	0	0	0	0
		0	0	battleship-1	100	50	25	13	6	3	2	1	0	0	0	0	
		0	0	battleship-2	100	50	25	13	6	3	2	1	0	0	0		
		0	0	battleship-3	100	50	25	13	6	3	2	1	0	0			
		0	0	battleship-4	100	50	25	13	6	3	2	1	0				
		1	1	battleship-5	99	50	25	12	6	3	2	1					
		2	2	battleship-6	98	50	25	12	6	3	2						
		3	3	battleship-7	97	50	25	13	6	3							
		6	6	battleship-8	94	50	25	13	6								
		12	12	battleship-9	88	50	25	13									
		25	25	battleship-10	75	50	25										
		50	50	battleship-11	50	50											

Table B.12: Destroyer Unit with 1 Damage Attacking

Damage = 1/3 Attack = 2*
Shot Damage = 1 Defense = 2
* = 1 versus fighters and bombers

-1	0	Attacking Destroyer Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicte 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
22	33	55	fighter	45	45											
	33	33	bomber	67	67											
	45	45	submarine	55	33	22										
	67	67	submarine-1	33	33											
30	30	60	transport	40	11	14	15									
30	45	75	transport-1	25	11	14										
22	67	89	transport-2	11	11											
19	12	31	destroyer	69	25	25	19									
25	25	50	destroyer-1	50	25	25										
25	50	75	destroyer-2	25	25											

-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
2	0	2	carrier	98	25	25	19	12	8	5	3	1				
3	1	4	carrier-1	96	25	25	19	12	8	4	3					
5	1	6	carrier-2	94	25	25	19	12	8	5						
8	3	11	carrier-3	89	25	25	19	12	8							
13	6	19	carrier-4	81	25	25	19	12								
19	12	31	carrier-5	69	25	25	19									
25	25	50	carrier-6	50	25	25										
25	50	75	carrier-7	25	25											
	0	0	cruiser	100	50	25	13	6	3	2	1	0				
	1	1	cruiser-1	99	50	25	12	6	3	2	1					
	2	2	cruiser-2	98	50	25	12	6	3	2						
	3	3	cruiser-3	97	50	25	13	6	3							
	6	6	cruiser-4	94	50	25	13	6								
	12	12	cruiser-5	88	50	25	13									
	25	25	cruiser-6	75	50	25										
	50	50	cruiser-7	50	50											

-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
	0	0	battleship	100	50	25	13	6	3	2	1	0	0	0	0	0
	0	0	battleship-1	100	50	25	13	6	3	2	1	0	0	0	0	
	0	0	battleship-2	100	50	25	13	6	3	2	1	0	0	0		
	0	0	battleship-3	100	50	25	13	6	3	2	1	0	0			
	0	0	battleship-4	100	50	25	13	6	3	2	1	0				
	1	1	battleship-5	99	50	25	12	6	3	2	1					
	2	2	battleship-6	98	50	25	12	6	3	2						
	3	3	battleship-7	97	50	25	13	6	3							
	6	6	battleship-8	94	50	25	13	6								
	12	12	battleship-9	88	50	25	13									
	25	25	battleship-10	75	50	25										
	50	50	battleship-11	50	50											

TABLE B.13: DESTROYER UNIT WITH 2 DAMAGE ATTACKING

Damage = 2/3 Attack = 1*+
Shot Damage = 1 Defense = 2
* = 1/2 versus Fighters and Bombers
+ = crippled

	ATTACKING	DEF.-	DEF.	PERCENTAGE CHANCE FOR THIS											
	DESTROYER	UNIT	UNIT	AMOUNT OF DAMAGE INFLICTED											
0	WINS	TYPE	WINS	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
20	20	fighter	80	80											
20	20	bomber	80	80											
25	25	submarine	75	50	25										
50	50	submarine-1	50	50											
12	12	transport	88	50	25	13									
25	25	transport-1	75	50	25										
50	50	transport-2	50	50											
4	4	destroyer	96	67	22	7									
11	11	destroyer-1	89	67	22										
33	33	destroyer-2	67	67											

	ATKR.	DEF.													
0	WINS	TYPE	WINS	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	carrier	100	67	22	7	3	1	0	0	0				
0	0	carrier-1	100	67	22	7	3	1	0	0					
0	0	carrier-2	100	67	22	7	3	1	0						
0	0	carrier-3	100	67	22	7	3	1							
1	1	carrier-4	99	67	22	7	3								
4	4	carrier-5	96	67	22	7									
11	11	carrier-6	89	67	22										
33	33	carrier-7	67	67											
0	0	cruiser	100	67	22	7	3	1	0	0	0				
0	0	cruiser-1	100	67	22	7	3	1	0	0					
0	0	cruiser-2	100	67	22	7	3	1	0						
0	0	cruiser-3	100	67	22	7	3	1							
1	1	cruiser-4	99	67	22	7	3								
4	4	cruiser-5	96	67	22	7									
11	11	cruiser-6	89	67	22										
33	33	cruiser-7	67	67											

0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	battleship	100	67	22	7	3	1	0	0	0	0	0	0	0
0	0	battleship-1	100	67	22	7	3	1	0	0	0	0	0	0	
0	0	battleship-2	100	67	22	7	3	1	0	0	0	0	0		
0	0	battleship-3	100	67	22	7	3	1	0	0	0	0			
0	0	battleship-4	100	67	22	7	3	1	0	0	0				
0	0	battleship-5	100	67	22	7	3	1	0	0					
0	0	battleship-6	100	67	22	7	3	1	0						
0	0	battleship-7	100	67	22	7	3	1							
1	1	battleship-8	99	67	22	7	3								
4	4	battleship-9	99	67	22	7									
11	11	battleship-10	89	67	22										
33	33	battleship-11	67	67											

Table B 14: Cruiser Unit Attacking

Damage = 0/8 Attack = 2*
Shot Damage = 2 Defense = 2
* = 1 versus fighters and bombers

-7	-6	-5	-4	-3	-2	-1	0	Attacking Cruiser Wins	Def.-Unit Type	Def.-Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-2	-4	-6	-8	-10
0	0	0	1	3	7	22	67	100	infantry&	0	0					
0	1	2	3	6	13	25	50	100	infantry*	0	0					
0	0	0	1	3	7	22	67	100	armor	0	0					
0	0	0	1	3	7	22	67	100	armor-1	0	0					
0	1	2	3	6	13	25	50	100	armor+	0	0					
0	1	2	3	6	13	25	50	100	armor-1+	0	0					
2	3	4	7	10	15	22	33	96	fighter	4	4					
	10		15		22		33	80	bomber	20	20					
	7			22		67		96	submarine	4	4					
	7			22		67		96	submarine-1	4	4					
0	0	1	3	6	15	30	45	100	transport	0	0	0				
0	0	0	1	3	7	22	67	100	transport-1	0	0					
0	0	0	1	3	7	22	67	100	transport-2	0	0					
2	3	5	8	13	19	25	25	98	destroyer	2	0	2				
0	1	2	3	6	13	25	50	100	destroyer-1	0	0					
0	1	2	3	6	13	25	50	100	destroyer-2	0	0					

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
6	8	11	14	16	16	12	6	89	carrier	11	0	2	3	6		
6	8	11	14	16	16	12	6	89	carrier-1	11	0	2	3	6		
4	5	8	12	16	19	19	12	95	carrier-2	5	0	2	3			
4	5	8	12	16	19	19	12	95	carrier-3	5	0	2	3			
1	3	5	8	12	19	25	25	98	carrier-4	2	0	2				
1	3	5	8	12	19	25	25	98	carrier-5	2	0	2				
0	1	2	3	6	13	25	50	100	carrier-6	0	0					
0	1	2	3	6	13	25	50	100	carrier-7	0	0					
	16		16		12		6	50	cruiser	50	6	12	16	16		
	16		16		12		6	50	cruiser-1	50	6	12	16	16		
	16		19		19		12	66	crusier-2	34	6	12	16			
	16		19		19		12	66	crusier-3	34	6	12	16			
	12		19		25		25	81	cruiser-4	19	6	13				
	12		19		25		25	81	cruiser-5	19	6	13				
	6		13		25		50	94	cruiser-6	6	6					
	6		13		25		50	94	cruiser-7	6	6					

-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
8			5			1		14	battleship	86	12	19	19	16	12	8
8			5			1		14	battleship-1	86	12	19	19	16	12	8
12			8			3		23	battleship-2	77	12	19	19	15	12	
12			8			3		23	battleship-3	77	12	19	19	15	12	
16			12			6		34	battleship-4	66	12	19	19	16		
16			12			6		34	battleship-5	66	12	19	19	16		
19			19			12		50	battleship-6	50	12	19	19			
19			19			12		50	battleship-7	50	12	19	19			
19			25			25		69	battleship-8	31	12	19				
19			25			25		69	battleship-9	31	12	19				
13			25			50		88	battleship-10	12	12					
13			25			50		8	battleship-11	12	12					

TABLE B.15: CRUISER UNIT WITH 1 DAMAGE ATTACKING

Damage = 1/8 Attack = 2*
Shot Damage = 2 Defense = 2
* = 1 versus fighters and bombers

-6	-5	-4	-3	-2	-1	0	Attacking Cruiser Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-2	-4	-6	-8	-10
0	0	1	3	7	22	67	100	infantry&	0	0					
1	2	3	6	12	25	50	99	infantry*	1	1					
0	0	1	3	7	22	67	100	armor	0	0					
0	0	1	3	7	22	67	100	armor-1	0	0					
1	2	3	6	12	25	50	99	armor+	1	1					
1	2	3	6	12	25	50	99	armor-1+	1	1					
3	4	7	10	15	22	33	94	fighter	6	6					
10		15		22		33	80	bomber	20	20					
7			22			67	96	submarine	4	4					
7			22			67	96	submarine-1	4	4					
0	1	3	6	15	30	45	100	transport	0	0	0				
0	0	1	3	7	22	67	100	transport-1	0	0					
0	0	1	3	7	22	67	100	transport-2	0	0					
3	5	8	13	19	25	25	96	destroyer	4	1	3				
1	2	3	6	12	25	50	99	destroyer-1	1	1					
1	2	3	6	12	25	50	99	destroyer-2	1	1					

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
8	11	14	16	16	12	6	83	carrier	17	1	3	5	8		
8	11	14	16	16	12	6	83	carrier-1	17	1	3	5	8		
5	8	12	16	19	19	12	91	carrier-2	9	1	3	5			
5	8	12	16	19	19	12	91	carrier-3	9	1	3	5			
3	4	8	12	19	25	25	96	carrier-4	4	1	3				
3	4	8	12	19	25	25	96	carrier-5	4	1	3				
1	2	3	6	12	25	50	99	carrier-6	1	1					
1	2	3	6	12	25	50	99	carrier-7	1	1					
16		16		12		6	50	cruiser	50	6	12	16	16		
16		16		12		6	50	cruiser-1	50	6	12	16	16		
16		19		19		12	66	cruiser-2	34	6	12	16			
16		19		19		12	66	cruiser-3	34	6	12	16			
12		19		25		25	81	cruiser-4	19	6	13				
12		19		25		25	81	cruiser-5	19	6	13				
6		13		25		50	94	cruiser-6	6	6					
6		13		25		50	94	cruiser-7	6	6					

-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
8			5			1	14	battleship	86	12	19	19	16	12	8
8			5			1	14	battleship-1	86	12	19	19	16	12	8
12			8			3	23	battleship-2	77	12	19	19	15	12	
12			8			3	23	battleship-3	77	12	19	19	15	12	
16			12			6	34	battleship-4	66	12	19	19	16		
16			12			6	34	battleship-5	66	12	19	19	16		
19			19			12	50	battleship-6	50	12	19	19			
19			19			12	50	battleship-7	50	12	19	19			
19			25			25	69	battleship-8	31	12	19				
19			25			25	69	battleship-9	31	12	19				
13			25			50	88	battleship-10	12	12					
13			25			50	88	battleship-11	12	12					

Table B.16: Cruiser Unit with 2 Damage Attacking

Damage = 2/8 Attack = 2*
Shot Damage = 2 Defense = 2
* = 1 versus fighters and bombers

-5	-4	-3	-2	-1	0	Attacking Cruiser Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicte 0	-2	-4	-6	-8	-10
0	1	3	7	22	67	100	infantry&	0	0					
2	3	6	12	25	50	98	infantry*	2	2					
0	1	3	7	22	67	100	armor	0	0					
0	1	3	7	22	67	100	armor-1	0	0					
2	3	6	12	25	50	98	armor+	2	2					
2	3	6	12	25	50	98	armor-1+	2	2					
4	7	10	15	22	33	91	fighter	9	9					
	15		22		33	70	bomber	30	30					
		22			67	89	submarine	11	11					
		22			67	89	submarine-1	11	11					
1	2	6	15	30	45	99	transport	1	0	1				
0	1	3	7	22	67	100	transport-1	0	0					
0	1	3	7	22	67	100	transport-2	0	0					
5	8	12	19	25	25	94	destroyer	6	1	5				
2	3	6	12	25	50	98	destroyer-1	2	2					
2	3	6	12	25	50	98	destroyer-2	2	2					

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
11	14	16	16	12	6	74	carrier	25	1	5	8	11		
11	14	16	16	12	6	74	carrier-1	25	1	5	8	11		
8	12	16	19	19	12	86	carrier-2	14	1	5	8			
8	12	16	19	19	12	86	carrier-3	14	1	5	8			
4	8	13	19	25	25	94	carrier-4	6	1	5				
4	8	13	19	25	25	94	carrier-5	6	1	5				
2	3	6	12	25	50	98	carrier-6	2	2					
2	3	6	12	25	50	98	carrier-7	2	2					
	16		12		6	34	cruiser	66	12	19	19	16		
	16		12		6	34	cruiser-1	66	12	19	19	16		
	19		19		12	50	cruiser-2	50	12	19	19			
	19		19		12	50	cruiser-3	50	12	19	19			
	19		25		25	69	cruiser-5	31	12	19				
	19		25		25	69	cruiser-6	31	12	19				
	13		25		50	88	cruiser-6	12	12					
	13		25		50	88	cruiser-7	12	12					

-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
		5			1	6	battleship	94	25	25	19	12	8	5
		5			1	6	battleship-1	94	25	25	19	12	8	5
		8			3	11	battleship-2	89	25	25	19	12	8	
		8			3	11	battleship-3	89	25	25	19	12	8	
		13			6	19	battleship-4	81	25	25	19	12		
		13			6	19	battleship-5	81	25	25	19	12		
		19			12	31	battleship-6	69	25	25	19			
		19			12	31	battleship-7	69	25	25	19			
		25			25	50	battleship-8	50	25	25				
		25			25	50	battleship-9	50	25	25				
		25			50	75	battleship-10	25	25					
		25			50	75	battleship-11	25	25					

TABLE B.17: CRUISER UNIT WITH 3 DAMAGE ATTACKING

Damage = 3/8 Attack = 2*
Shot Damage = 2 Defense = 2
* = 1 versus fighters and bombers

-4	-3	-2	-1	0	ATTACKING CRUISER WINS	DEF.- UNIT TYPE	DEF. UNIT WINS	PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE INFLICTED 0	-2	-4	-6	-8	-10
1	3	7	22	67	100	infantry&	0	0					
3	6	13	25	50	97	infantry*	3	3					
1	3	7	22	67	100	armor	0	0					
1	3	7	22	67	100	armor-1	0	0					
3	6	13	25	50	97	armor+	3	3					
3	6	13	25	50	97	armor-1+	3	3					
6	10	15	22	33	86	fighter	14	14					
15		22		33	70	bomber	30	30					
	22			67	89	submarine	11	11					
	22			67	89	submarine-1	11	11					
2	6	15	30	45	98	transport	2	1	1				
1	3	7	22	67	100	transport-1	0	0					
1	3	7	22	67	100	transport-2	0	0					
8	12	19	25	25	89	destroyer	11	3	8				
3	6	13	25	50	97	destroyer-1	3	3					
3	6	13	25	50	97	destroyer-2	3	3					

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-4	-3	-2	-1	0	ATKR. WINS	DEF. TYPE	WINS	0	-2	-4	-6	-8	-10
13	16	16	12	6	63	carrier	36	3	8	12	13		
13	16	16	12	6	63	carrier-1	36	3	8	12	13		
12	15	19	19	12	77	carrier-2	23	3	8	12			
12	15	19	19	12	77	carrier-3	23	3	8	12			
8	12	19	25	25	89	carrier-4	11	3	8				
8	12	19	25	25	89	carrier-5	11	3	8				
3	6	13	25	50	97	carrier-6	3	3					
3	6	13	25	50	97	carrier-7	3	3					
16		12		6	34	cruiser	66	12	19	19	16		
16		12		6	34	cruiser-1	66	12	19	19	16		
19		19		12	50	crusier-2	50	12	19	19			
19		19		12	50	crusier-3	50	12	19	19			
19		25		25	69	cruiser-5	31	12	19				
19		25		25	69	cruiser-6	31	12	19				
13		25		50	88	cruiser-6	12	12					
13		25		50	88	cruiser-7	12	12					

-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
	5			1	6	battleship	94	25	25	19	12	8	5
	5			1	6	battleship-1	94	25	25	19	12	8	5
	8			3	11	battleship-2	89	25	25	19	12	8	
	8			3	11	battleship-3	89	25	25	19	12	8	
	13			6	19	battleship-4	81	25	25	19	12		
	13			6	19	battleship-5	81	25	25	19	12		
	19			12	31	battleship-6	69	25	25	19			
	19			12	31	battleship-7	69	25	25	19			
	25			25	50	battleship-8	50	25	25				
	25			25	50	battleship-9	50	25	25				
	25			50	75	battleship-10	25	25					
	25			50	75	battleship-11	25	25					

Table B.18: Cruiser Unit with 4 Damage Attacking

Damage = 4/8 Attack = 1*+
Shot Damage = 2 Defense = 2
* = ½ versus fighters and bombers
+ = crippled

-3	-2	-1	0	Attacking Cruiser Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-2	-4	-6	-8	-10
6	13	25	50	94	infantry&	6	6					
10	15	22	33	80	infantry*	20	20					
6	13	25	50	94	armor	6	6					
6	13	25	50	94	armor-1	6	6					
10	15	22	33	80	armor+	20	20					
10	15	22	33	80	armor-1+	20	20					
10	13	16	20	59	fighter	41	41					
	16		20	36	bomber	64	64					
25			50	75	submarine	25	25					
25			50	75	submarine-1	25	25					
12	19	25	25	81	transport	19	13	6				
6	13	25	50	94	transport-1	6	6					
6	13	25	50	94	transport-2	6	6					
13	15	14	11	53	destroyer	47	20	27				
10	15	22	33	80	destroyer-1	20	20					
10	15	22	33	80	destroyer-2	20	20					

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-3	-2	-1	0	Wins	Atkr. Type	Def. Wins	0	-2	-4	-6	-8	-10
7	6	3	1	17	carrier	83	20	27	22	14		
7	6	3	1	17	carrier-1	83	20	27	22	14		
11	10	7	3	31	carrier-2	69	20	27	22			
11	10	7	3	31	carrier-3	69	20	27	22			
13	15	14	11	53	carrier-4	47	20	27				
13	15	14	11	53	carrier-5	47	20	27				
10	15	22	33	80	carrier-6	20	20					
10	15	22	33	80	carrier-7	20	20					
	3		1	4	cruiser	96	45	30	15	6		
	3		1	4	cruiser-1	96	45	30	15	6		
	7		4	11	cruiser-2	89	45	30	14			
	7		4	11	cruiser-3	89	45	30	14			
	14		11	25	cruiser-4	75	45	30				
	14		11	25	cruiser-5	75	45	30				
	22		33	55	cruiser-6	45	45					
	22		33	55	cruiser-7	45	45					

-3	-2	-1	0	Wins	Atkr. Type	Def. Wins	0	-2	-4	-6	-8	-10
1			0	1	battleship	99	45	30	15	6	2	1
1			0	1	battleship-1	99	45	30	15	6	2	1
1			1	2	battleship-2	98	45	30	15	6	2	
1			1	2	battleship-3	98	45	30	15	6	2	
3			1	4	battleship-4	96	45	30	15	6		
3			1	4	battleship-5	96	45	30	15	6		
7			4	11	battleship-6	89	45	29	15			
7			4	11	battleship-7	89	45	29	15			
14			11	25	battleship-8	75	45	30				
14			11	25	battleship-9	75	45	30				
22			33	55	battleship-10	45	45					
22			33	55	battleship-11	45	45					

TABLE B.19: CRUISER UNIT WITH 5 DAMAGE ATTACKING

Damage = 5/8 Attack = 1*+
Shot Damage = 2 Defense = 2
* = 1/2 versus fighters and bombers
+ = crippled

-2	-1	0	ATTACKING CRUISER WINS	DEF.-UNIT TYPE	DEF. UNIT WINS	PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE INFLICTED 0	-2	-4	-6	-8	-10
13	25	50	88	infantry&	12	12					
15	22	33	70	infantry*	30	30					
13	25	50	88	armor	12	12					
13	25	50	88	armor-1	12	12					
15	22	33	70	armor+	30	30					
15	22	33	70	armor-1+	30	30					
13	16	20	49	fighter	51	51					
16		20	36	bomber	64	64					
		50	50	submarine	50	50					
		50	50	submarine-1	50	50					
19	25	25	69	transport	31	12	19				
13	25	50	88	transport-1	12	12					
13	25	50	88	transport-2	12	12					
15	14	11	40	destroyer	60	30	30				
15	22	33	70	destroyer-1	30	30					
15	22	33	70	destroyer-2	30	30					

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-2	-1	0	ATKR. WINS	DEF. TYPE	WINS	0	-2	-4	-6	-8	-10
6	3	1	10	carrier	90	30	30	19	11		
6	3	1	10	carrier-1	90	30	30	19	11		
10	7	3	20	carrier-2	80	30	30	20			
10	7	3	20	carrier-3	80	30	30	20			
15	14	11	40	carrier-4	60	30	30				
15	14	11	40	carrier-5	60	30	30				
15	22	33	70	carrier-6	30	30					
15	22	33	70	carrier-7	30	30					
3		1	4	cruiser	96	45	30	15	6		
3		1	4	cruiser-1	96	45	30	15	6		
7		4	11	cruiser-2	89	45	30	14			
7		4	11	cruiser-3	89	45	30	14			
14		11	25	cruiser-4	75	45	30				
14		11	25	cruiser-5	75	45	30				
22		33	55	cruiser-6	45	45					
22		33	55	cruiser-7	45	45					

-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
		0	0	battleship	100	67	22	7	3	1	0
		0	0	battleship-1	100	67	22	7	3	1	0
		0	0	battleship-2	100	67	22	7	3	1	
		0	0	battleship-3	100	67	22	7	3	1	
		1	1	battleship-4	99	67	22	7	3		
		1	1	battleship-5	99	67	22	7	3		
		4	4	battleship-6	96	67	22	7			
		4	4	battleship-7	96	67	22	7			
		11	11	battleship-8	89	67	22				
		11	11	battleship-9	89	67	22				
		33	33	battleship-10	67	67					
		33	33	battleship-11	67	67					

Table B.20: Cruiser Unit with 6 Damage Attacking

Damage = 6/8 Attack = 1*+
Shot Damage = 2 Defense = 2
* = 1/2 versus fighters and bombers
+ = crippled

-1	0	Attacking Cruiser Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-2	-4	-6	-8	-10
25	50	75	infantry&	25	25					
22	33	55	infantry*	45	45					
25	50	75	armor	25	25					
25	50	75	armor-1	25	25					
22	33	55	armor+	45	45					
22	33	55	armor-1+	45	45					
16	20	36	fighter	64	64					
	20	20	bomber	80	80					
	50	50	submarine	50	50					
	50	50	submarine-1	50	50					
25	25	50	transport	50	25	25				
25	50	75	transport-1	25	25					
25	50	75	transport-2	25	25					
14	11	25	destroyer	75	45	30				
22	33	55	destroyer-1	45	45					
22	33	55	destroyer-2	45	45					

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-1	0	Wins	Atkr. Type	Def. Wins	0	-2	-4	-6	-8	-10
3	1	4	carrier	96	45	30	15	6		
3	1	4	carrier-1	96	45	30	15	6		
7	4	11	carrier-2	89	45	29	15			
7	4	11	carrier-3	89	45	29	15			
14	11	25	carrier-4	75	45	30				
14	11	25	carrier-5	75	45	30				
22	33	55	carrier-6	45	45					
22	33	55	carrier-7	45	45					
	1	1	cruiser	99	67	22	7	3		
	1	1	cruiser-1	99	67	22	7	3		
	4	4	cruiser-2	96	67	22	7			
	4	4	cruiser-3	96	67	22	7			
	11	11	cruiser-4	89	67	22				
	11	11	cruiser-5	89	67	22				
	33	33	cruiser-6	67	67					
	33	33	cruiser-7	67	67					

-1	0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
	0	0	battleship	100	67	22	7	3	1	0
	0	0	battleship-1	100	67	22	7	3	1	0
	0	0	battleship-2	100	67	22	7	3	1	
	0	0	battleship-3	100	67	22	7	3	1	
	1	1	battleship-4	99	67	22	7	3		
	1	1	battleship-5	99	67	22	7	3		
	4	4	battleship-6	96	67	22	7			
	4	4	battleship-7	96	67	22	7			
	11	11	battleship-8	89	67	22				
	11	11	battleship-9	89	67	22				
	33	33	battleship-10	67	67					
	33	33	battleship-11	67	67					

TABLE B.21: CRUISER UNIT WITH 7 DAMAGE ATTACKING

Damage = 7/8 Attack = 1*+
Shot Damage = 2 Defense = 2
* = ½ versus fighters and bombers
+ = crippled

0	Attacking Cruiser Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-2	-4	-6	-8	-10
50	50	infantry&	50	50					
33	33	infantry*	67	67					
50	50	armor	50	50					
50	50	armor-1	50	50					
33	33	armor+	67	67					
33	33	armor-1+	67	67					
20	20	fighter	80	80					
20	20	bomber	80	80					
50	50	submarine	50	50					
50	50	submarine-1	50	50					
25	25	transport	75	50	25				
50	50	transport-1	50	50					
50	50	transport-2	50	50					
11	11	destroyer	89	67	22				
33	33	destroyer-1	67	67					
33	33	destroyer-2	67	67					

& infantry/air base
* infantry in woods or mountains
+ armor in woods

0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
1	1	carrier	99	67	22	7	3		
1	1	carrier-1	99	67	22	7	3		
4	4	carrier-2	96	67	22	7			
4	4	carrier-3	96	67	22	7			
11	11	carrier-4	89	67	22				
11	11	carrier-5	89	67	22				
33	33	carrier-6	67	67					
33	33	carrier-7	67	67					
1	1	cruiser	99	67	22	7	3		
1	1	cruiser-1	99	67	22	7	3		
4	4	cruiser-2	96	67	22	7			
4	4	cruiser-3	96	67	22	7			
11	11	cruiser-4	89	67	22				
11	11	cruiser-5	89	67	22				
33	33	cruiser-6	67	67					
33	33	cruiser-7	67	67					

0	Atkr. Wins	Def. Type	Wins	0	-2	-4	-6	-8	-10
0	0	battleship	100	67	22	7	3	1	0
0	0	battleship-1	100	67	22	7	3	1	0
0	0	battleship-2	100	67	22	7	3	1	
0	0	battleship-3	100	67	22	7	3	1	
1	1	battleship-4	99	67	22	7	3		
1	1	battleship-5	99	67	22	7	3		
4	4	battleship-6	96	67	22	7			
4	4	battleship-7	96	67	22	7			
11	11	battleship-8	89	67	22				
11	11	battleship-9	89	67	22				
33	33	battleship-10	67	67					
33	33	battleship-11	67	67					

Table B. 22: Battleship Unit Attacking

Damage = 9/12 Attack = 2*
Shot Damage = 3 Defense = 2
* = 1 versus fighters and bombers

Percentage Chance for This Amount of Damage Suffered												Attacking Battleship	Def.- Unit	Def. Unit				
-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	Wins	Type	Wins	0	-3	-6	-9
0	0	0	0	0	0	0	1	3	7	22	67	100	infantry&	0	0			
0	0	0	0	0	1	2	3	6	13	25	50	100	infantry*	0	0			
0	0	0	0	0	0	0	1	3	7	22	67	100	armor	0	0			
0	0	0	0	0	0	0	1	3	7	22	67	100	armor-1	0	0			
0	0	0	0	0	1	2	3	6	13	25	50	100	armor+	0	0			
0	0	0	0	0	1	2	3	6	13	25	50	100	armor-1+	0	0			
0	1	1	1	2	3	4	7	10	15	22	33	99	fighter	1	1			
	4		7		10		15		22		33	91	bomber	9	9			
		3			7			22			67	99	submarine	1	1			
		3			7			22			67	99	submarine-1	1	1			
0	0	0	0	0	0	0	1	3	7	22	67	100	transport	0	0			
0	0	0	0	0	0	0	1	3	7	22	67	100	transport-1	0	0			
0	0	0	0	0	0	0	1	3	7	22	67	100	transport-2	0	0			
0	0	0	0	0	1	2	3	6	13	25	50	100	destroyer	0	0			
0	0	0	0	0	1	2	3	6	13	25	50	100	destroyer-1	0	0			
0	0	0	0	0	1	2	3	6	13	25	50	100	destroyer-2	0	0			

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
0	1	1	2	4	5	8	12	16	19	19	12	99	carrier	1	0	0	1	
0	1	1	2	4	5	8	12	16	19	19	12	99	carrier-1	1	0	0	1	
0	0	0	1	2	3	5	8	12	19	25	25	100	carrier-2	0	0	0		
0	0	0	1	2	3	5	8	12	19	25	25	100	carrier-3	0	0	0		
0	0	0	1	2	3	5	8	12	19	25	25	100	carrier-4	0	0	0		
0	0	0	0	0	1	2	3	6	13	25	50	100	carrier-5	0	0			
0	0	0	0	0	1	2	3	6	13	25	50	100	carrier-6	0	0			
0	0	0	0	0	1	2	3	6	13	25	50	100	carrier-7	0	0			
	8		12		16		19		19		12	86	cruiser	14	1	5	8	
	8		12		16		19		19		12	86	cruiser-1	14	1	5	8	
	5		8		12		19		25		25	94	cruiser-2	6	1	5		
	5		8		12		19		25		25	94	cruiser-3	6	1	5		
	5		8		12		19		25		25	94	cruiser-4	6	1	5		
	2		3		6		13		25		50	99	cruiser-5	1	1			
	2		3		6		13		25		50	99	cruiser-6	1	1			
	2		3		6		13		25		50	99	cruiser-7	1	1			

-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
		16			16			12			6	50	battleship	50	6	12	16	16
		16			16			12			6	50	battleship-1	50	6	12	16	16
		16			16			12			6	50	battleship-2	50	6	12	16	16
		16			19			19			12	66	battleship-3	34	6	12	16	
		16			19			19			12	66	battleship-4	34	6	12	16	
		16			19			19			12	66	battleship-5	34	6	12	16	
		12			19			25			25	82	battleship-6	18	6	12		
		12			19			25			25	82	battleship-7	18	6	12		
		12			19			25			25	82	battleship-8	18	6	12		
		6			13			25			50	96	battleship-9	6	6			
		6			13			25			50	96	battleship-10	6	6			
		6			13			25			50	96	battleship-11	6	6			

TABLE B.23: BATTLESHIP UNIT WITH 1 DAMAGE ATTACKING

Damage = 1/12 Attack = 2*
Shot Damage = 3 Defense = 2
* = 1 versus fighters and bombers

PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE SUFFERED											ATTACKING BATTLESHIP	DEF.- UNIT	DEF. UNIT				
-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	WINS	TYPE	WINS	0	-3	-6	-9
0	0	0	0	0	0	1	3	7	22	67	100	infantry&	0	0			
0	0	0	0	1	2	3	6	13	25	50	100	infantry*	0	0			
0	0	0	0	0	0	1	3	7	22	67	100	armor	0	0			
0	0	0	0	0	0	1	3	7	22	67	100	armor-1	0	0			
0	0	0	0	1	2	3	6	13	25	50	100	armor+	0	0			
0	0	0	0	1	2	3	6	13	25	50	100	armor-1+	0	0			
1	1	1	2	3	4	7	10	15	22	33	99	fighter	1	1			
4		7		10		15		22		33	91	bomber	9	9			
	3			7			22			67	99	submarine	1	1			
	3			7			22			67	99	submarine-1	1	1			
0	0	0	0	0	0	1	3	7	22	67	100	transport	0	0			
0	0	0	0	0	0	1	3	7	22	67	100	transport-1	0	0			
0	0	0	0	0	0	1	3	7	22	67	100	transport-2	0	0			
0	0	0	0	1	2	3	6	13	25	50	100	destroyer	0	0			
0	0	0	0	1	2	3	6	13	25	50	100	destroyer-1	0	0			
0	0	0	0	1	2	3	6	13	25	50	100	destroyer-2	0	0			

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	ATKR. WINS	DEF. TYPE	WINS	0	-3	-6	-9
1	1	2	4	5	8	12	16	19	19	12	99	carrier	1	0	0	1	
1	1	2	4	5	8	12	16	19	19	12	99	carrier-1	1	0	0	1	
0	0	1	2	3	5	8	12	19	25	25	100	carrier-2	0	0	0		
0	0	1	2	3	5	8	12	19	25	25	100	carrier-3	0	0	0		
0	0	1	2	3	5	8	12	19	25	25	100	carrier-4	0	0	0		
0	0	0	0	1	2	3	6	13	25	50	100	carrier-5	0	0			
0	0	0	0	1	2	3	6	13	25	50	100	carrier-6	0	0			
0	0	0	0	1	2	3	6	13	25	50	100	carrier-7	0	0			
8		12		16		19		19		12	86	cruiser	14	1	5	8	
8		12		16		19		19		12	86	cruiser-1	14	1	5	8	
5		8		12		19		25		25	94	cruiser-2	6	1	5		
5		8		12		19		25		25	94	cruiser-3	6	1	5		
5		8		12		19		25		25	94	cruiser-4	6	1	5		
2		3		6		13		25		50	99	cruiser-5	1	1			
2		3		6		13		25		50	99	cruiser-6	1	1			
2		3		6		13		25		50	99	cruiser-7	1	1			

-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
	16			16			12			6	50	battleship	50	6	12	16	16
	16			16			12			6	50	battleship-1	50	6	12	16	16
	16			16			12			6	50	battleship-2	50	6	12	16	16
	16			19			19			12	66	battleship-3	34	6	12	16	
	16			19			19			12	66	battleship-4	34	6	12	16	
	16			19			19			12	66	battleship-5	34	6	12	16	
	12			19			25			25	82	battleship-6	18	6	12		
	12			19			25			25	82	battleship-7	18	6	12		
	12			19			25			25	82	battleship-8	18	6	12		
	6			13			25			50	96	battleship-9	6	6			
	6			13			25			50	96	battleship-10	6	6			
	6			13			25			50	96	battleship-11	6	6			

Table B.24: Battleship Unit with 2 Damage Attacking

Damage = 2/12 Attack = 2*
Shot Damage = 3 Defense = 2
* = 1 versus fighters and bombers

Percentage Chance for This Amount of Damage Suffered										Attacking Battleship	Def.- Unit	Def. Unit				
-9	-8	-7	-6	-5	-4	-3	-2	-1	0	Wins	Type	Wins	0	-3	-6	-9
0	0	0	0	0	1	3	7	22	67	100	infantry&	0	0			
0	0	0	1	2	3	6	13	25	50	100	infantry*	0	0			
0	0	0	0	0	1	3	7	22	67	100	armor	0	0			
0	0	0	0	0	1	3	7	22	67	100	armor-1	0	0			
0	0	0	1	2	3	6	13	25	50	100	armor+	0	0			
0	0	0	1	2	3	6	13	25	50	100	armor-1+	0	0			
1	1	2	3	4	7	10	15	22	33	98	fighter	2	2			
	6		10		15		22		33	86	bomber	14	14			
3			7			22			67	99	submarine	1	1			
3			7			22			67	99	submarine-1	1	1			
0	0	0	0	0	1	3	7	22	67	100	transport	0	0			
0	0	0	0	0	1	3	7	22	67	100	transport-1	0	0			
0	0	0	0	0	1	3	7	22	67	100	transport-2	0	0			
0	0	0	1	2	3	6	13	25	50	100	destroyer	0	0			
0	0	0	1	2	3	6	13	25	50	100	destroyer-1	0	0			
0	0	0	1	2	3	6	13	25	50	100	destroyer-2	0	0			

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
1	2	4	5	8	12	16	19	19	12	98	carrier	2	0	1	1	
1	2	4	5	8	12	16	19	19	12	98	carrier-1	2	0	1	1	
0	1	2	3	5	8	12	19	25	25	100	carrier-2	0	0	0		
0	1	2	3	5	8	12	19	25	25	100	carrier-3	0	0	0		
0	1	2	3	5	8	12	19	25	25	100	carrier-4	0	0	0		
0	0	0	1	2	3	6	13	25	50	100	carrier-5	0	0			
0	0	0	1	2	3	6	13	25	50	100	carrier-6	0	0			
0	0	0	1	2	3	6	13	25	50	100	carrier-7	0	0			
	12		15		19		19		12	77	cruiser	23	3	8	12	
	12		15		19		19		12	77	cruiser-1	23	3	8	12	
	8		12		19		25		25	89	cruiser-2	11	3	8		
	8		12		19		25		25	89	cruiser-3	11	3	8		
	8		12		19		25		25	89	cruiser-4	11	3	8		
	3		6		13		25		50	97	cruiser-5	3	3			
	3		6		13		25		50	97	cruiser-6	3	3			
	3		6		13		25		50	97	cruiser-7	3	3			

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
16			16			12			6	50	battleship	50	6	12	16	16
16			16			12			6	50	battleship-1	50	6	12	16	16
16			16			12			6	50	battleship-2	50	6	12	16	16
16			19			19			12	66	battleship-3	34	6	12	16	
16			19			19			12	66	battleship-4	34	6	12	16	
16			19			19			12	66	battleship-5	34	6	12	16	
12			19			25			25	82	battleship-6	18	6	12		
12			19			25			25	82	battleship-7	18	6	12		
12			19			25			25	82	battleship-8	18	6	12		
6			13			25			50	96	battleship-9	6	6			
6			13			25			50	96	battleship-10	6	6			
6			13			25			50	96	battleship-11	6	6			

TABLE B.25: BATTLESHIP UNIT WITH 3 DAMAGE ATTACKING

Damage = 3/12 Attack = 2*
Shot Damage = 3 Defense = 2
* = 1 versus fighters and bombers

PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE SUFFERED									ATTACKING BATTLESHIP	DEF.- UNIT	DEF. UNIT				
-8	-7	-6	-5	-4	-3	-2	-1	0	WINS	TYPE	WINS	0	-3	-6	-9
0	0	0	0	1	3	7	22	67	100	infantry&	0	0			
0	0	1	2	3	6	13	25	50	100	infantry*	0	0			
0	0	0	0	1	3	7	22	67	100	armor	0	0			
0	0	0	0	1	3	7	22	67	100	armor-1	0	0			
0	0	1	2	3	6	13	25	50	100	armor+	0	0			
0	0	1	2	3	6	13	25	50	100	armor-1+	0	0			
1	2	3	4	7	10	15	22	33	97	fighter	3	3			
6		10		15		22		33	86	bomber	14	14			
		7			22			67	96	submarine	4	4			
		7			22			67	96	submarine-1	4	4			
0	0	0	0	1	3	7	22	67	100	transport	0	0			
0	0	0	0	1	3	7	22	67	100	transport-1	0	0			
0	0	0	0	1	3	7	22	67	100	transport-2	0	0			
0	0	1	2	3	6	13	25	50	100	destroyer	0	0			
0	0	1	2	3	6	13	25	50	100	destroyer-1	0	0			
0	0	1	2	3	6	13	25	50	100	destroyer-2	0	0			

&infantry/air base
* infantry in woods or mountains
+ armor in woods

									ATKR.	DEF.					
-8	-7	-6	-5	-4	-3	-2	-1	0	WINS	TYPE	WINS	0	-3	-6	-9
2	4	5	8	12	16	19	19	12	97	carrier	3	0	1	2	
2	4	5	8	12	16	19	19	12	97	carrier-1	3	0	1	2	
1	1	3	5	8	12	19	25	25	99	carrier-2	1	0	1		
1	1	3	5	8	12	19	25	25	99	carrier-3	1	0	1		
1	1	3	5	8	12	19	25	25	99	carrier-4	1	0	1		
0	0	1	2	3	6	13	25	50	100	carrier-5	0	0			
0	0	1	2	3	6	13	25	50	100	carrier-6	0	0			
0	0	1	2	3	6	13	25	50	100	carrier-7	0	0			
12		15		19		19		12	77	cruiser	23	3	8	12	
12		15		19		19		12	77	cruiser-1	23	3	8	12	
8		12		19		25		25	89	cruiser-2	11	3	8		
8		12		19		25		25	89	cruiser-3	11	3	8		
8		12		19		25		25	89	cruiser-4	11	3	8		
3		6		13		25		50	97	cruiser-5	3	3			
3		6		13		25		50	97	cruiser-6	3	3			
3		6		13		25		50	97	cruiser-7	3	3			

-8	-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
		16			12			6	34	battleship	66	12	19	19	16
		16			12			6	34	battleship-1	66	12	19	19	16
		16			12			6	34	battleship-2	66	12	19	19	16
		19			19			12	50	battleship-3	50	12	19	19	
		19			19			12	50	battleship-4	50	12	19	19	
		19			19			12	50	battleship-5	50	12	19	19	
		19			25			25	69	battleship-6	31	12	19		
		19			25			25	69	battleship-7	31	12	19		
		19			25			25	69	battleship-8	31	12	19		
		13			25			50	88	battleship-9	12	12			
		13			25			50	88	battleship-10	12	12			
		13			25			50	88	battleship-11	12	12			

Table B.26: Battleship Unit with 4 Damage Attacking

Damage = 4/12 Attack = 2*
Shot Damage = 3 Defense = 2
* = 1 versus fighters and bombers

Percentage Chance for This Amount of Damage Suffered								Attacking Battleship	Def.-Unit	Def. Unit				
-7	-6	-5	-4	-3	-2	-1	0	Wins	Type	Wins	0	-3	-6	-9
0	0	0	1	3	7	22	67	100	infantry&	0	0			
0	1	2	3	6	13	25	50	100	infantry*	0	0			
0	0	0	1	3	7	22	67	100	armor	0	0			
0	0	0	1	3	7	22	67	100	armor-1	0	0			
0	1	2	3	6	13	25	50	100	armor+	0	0			
0	1	2	3	6	13	25	50	100	armor-1+	0	0			
2	3	4	7	10	15	22	33	96	fighter	4	4			
	10		15		22		33	80	bomber	20	20			
	7			22			67	96	submarine	4	4			
	7			22			67	96	submarine-1	4	4			
0	0	0	1	3	7	22	67	100	transport	0	0			
0	0	0	1	3	7	22	67	100	transport-1	0	0			
0	0	0	1	3	7	22	67	100	transport-2	0	0			
0	1	2	3	6	13	25	50	100	destroyer	0	0			
0	1	2	3	6	13	25	50	100	destroyer-1	0	0			
0	1	2	3	6	13	25	50	100	destroyer-2	0	0			

&infantry/air base
* infantry in woods or mountains
+ armor in woods

-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
4	5	8	12	16	19	19	12	95	carrier	5	0	2	3	
4	5	8	12	16	19	19	12	95	carrier-1	5	0	2	3	
1	3	5	8	12	19	25	25	98	carrier-2	2	0	2		
1	3	5	8	12	19	25	25	98	carrier-3	2	0	2		
1	3	5	8	12	19	25	25	99	carrier-4	2	0	2		
0	1	2	3	6	13	25	50	100	carrier-5	0	0			
0	1	2	3	6	13	25	50	100	carrier-6	0	0			
0	1	2	3	6	13	25	50	100	carrier-7	0	0			
	15		19		19		12	66	cruiser	34	6	12	16	
	15		19		19		12	66	cruiser-1	34	6	12	16	
	12		19		25		25	81	cruiser-2	19	6	13		
	12		19		25		25	81	cruiser-3	19	6	13		
	12		19		25		25	81	cruiser-4	19	6	13		
	6		13		25		50	94	cruiser-5	6	6			
	6		13		25		50	94	cruiser-6	6	6			
	6		13		25		50	94	cruiser-7	6	6			

-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
	16			12			6	34	battleship	66	12	19	19	16
	16			12			6	34	battleship-1	66	12	19	19	16
	16			12			6	34	battleship-2	66	12	19	19	16
	19			19			12	50	battleship-3	50	12	19	19	
	19			19			12	50	battleship-4	50	12	19	19	
	19			19			12	50	battleship-5	50	12	19	19	
	19			25			25	69	battleship-6	31	12	19		
	19			25			25	69	battleship-7	31	12	19		
	19			25			25	69	battleship-8	31	12	19		
	13			25			50	88	battleship-9	12	12			
	13			25			50	88	battleship-10	12	12			
	13			25			50	88	battleship-11	12	12			

TABLE B.27: BATTLESHIP UNIT WITH 5 DAMAGE ATTACKING

Damage = 5/12 Attack = 2*
Shot Damage = 3 Defense = 2
* = 1 versus fighters and bombers

-6	-5	-4	-3	-2	-1	0	Attacking Battleship Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-3	-6	-9
0	0	1	3	7	22	67	100	infantry&	0	0			
1	2	3	6	12	25	50	99	infantry*	1	1			
0	0	1	3	7	22	67	100	armor	0	0			
0	0	1	3	7	22	67	100	armor-1	0	0			
1	2	3	6	12	25	50	99	armor+	1	1			
1	2	3	6	12	25	50	99	armor-1+	1	1			
3	4	7	10	15	22	33	94	fighter	6	6			
10		15		22		33	80	bomber	20	20			
7			22			67	96	submarine	4	4			
7			22			67	96	submarine-1	4	4			
0	0	1	3	7	22	67	100	transport	0	0			
0	0	1	3	7	22	67	100	transport-1	0	0			
0	0	1	3	7	22	67	100	transport-2	0	0			
1	2	3	6	12	25	50	99	destroyer	1	1			
1	2	3	6	12	25	50	99	destroyer-1	1	1			
1	2	3	6	12	25	50	99	destroyer-2	1	1			

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
5	8	12	16	19	19	12	91	carrier	9	1	3	5	
5	8	12	16	19	19	12	91	carrier-1	9	1	3	5	
3	4	8	12	19	25	25	96	carrier-2	4	1	3		
3	4	8	12	19	25	25	96	carrier-3	4	1	3		
3	4	8	12	19	25	25	96	carrier-4	4	1	3		
1	2	3	6	12	25	50	99	carrier-5	1	1			
1	2	3	6	12	25	50	99	carrier-6	1	1			
1	2	3	6	12	25	50	99	carrier-7	1	1			
15		19		19		12	66	cruiser	34	6	12	16	
15		19		19		12	66	cruiser-1	34	6	12	16	
12		19		25		25	81	cruiser-2	19	6	13		
12		19		25		25	81	cruiser-3	19	6	13		
12		19		25		25	81	cruiser-4	19	6	13		
6		13		25		50	94	cruiser-5	6	6			
6		13		25		50	94	cruiser-6	6	6			
6		13		25		50	94	cruiser-7	6	6			

-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
16			12			6	34	battleship	66	12	19	19	16
16			12			6	34	battleship-1	66	12	19	19	16
16			12			6	34	battleship-2	66	12	19	19	16
19			19			12	50	battleship-3	50	12	19	19	
19			19			12	50	battleship-4	50	12	19	19	
19			19			12	50	battleship-5	50	12	19	19	
19			25			25	69	battleship-6	31	12	19		
19			25			25	69	battleship-7	31	12	19		
19			25			25	69	battleship-8	31	12	19		
13			25			50	88	battleship-9	12	12			
13			25			50	88	battleship-10	12	12			
13			25			50	88	battleship-11	12	12			

Table B.28: Battleship Unit with 6 Damage Attacking

Damage = 6/12 Attack = 1*+
Shot Damage = 3 Defense = 2
* = 1/2 versus fighters and bombers
+ = crippled

-5	-4	-3	-2	-1	0	Attacking Battleship Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Suffered 0	-3	-6	-9
2	3	6	12	25	50	98	infantry&	2	2			
4	7	10	15	22	33	91	infantry*		9		9	
2	3	6	12	25	50	98	armor		2		2	
2	3	6	12	25	50	98	armor-1		2		2	
4	7	10	15	22	33	91	armor+		9		9	
4	7	10	15	22	33	91	armor-1+		9		9	
7	8	10	13	16	20	74	fighter	26	26			
	13		16		20	49	bomber	51	51			
		25			50	75	submarine	25	25			
		25			50	75	submarine-1	25	25			
2	3	6	12	25	50	98	transport		2		2	
2	3	6	12	25	50	98	transport-1		2		2	
2	3	6	12	25	50	98	transport-2		2		2	
4	7	10	15	22	33	91	destroyer		9		9	
4	7	10	15	22	33	91	destroyer-1		9		9	
4	7	10	15	22	33	91	destroyer-2		9		9	

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
10	11	11	10	7	3	52	carrier	48	9	18	21	
10	11	11	10	7	3	52	carrier-1	48	9	18	21	
9	11	13	15	14	11	73	carrier-2	27	9	18		
9	11	13	15	14	11	73	carrier-3	27	9	18		
9	11	13	15	14	11	73	carrier-4	27	9	18		
4	7	10	15	22	33	91	carrier-5	9	9			
4	7	10	15	22	33	91	carrier-6	9	9			
4	7	10	15	22	33	91	carrier-7	9	9			
	10		7		3	20	cruiser	80	30	30	20	
	10		7		3	20	cruiser-1	80	30	30	20	
	15		14		11	40	cruiser-2	60	30	30		
	15		14		11	40	cruiser-3	60	30	30		
	15		14		11	40	cruiser-4	60	30	30		
	15		22		33	70	cruiser-5	30	30			
	15		22		33	70	cruiser-6	30	30			
	15		22		33	70	cruiser-7	30	30			

-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
		3			1	4	battleship	96	45	30	15	6
		3			1	4	battleship-1	96	45	30	15	6
		3			1	4	battleship-2	96	45	30	15	6
		7			4	11	battleship-3	89	45	29	15	
		7			4	11	battleship-4	89	45	29	15	
		7			4	11	battleship-5	89	45	29	15	
		14			11	25	battleship-6	75	45	30		
		14			11	25	battleship-7	75	45	30		
		14			11	25	battleship-8	75	45	30		
		22			33	55	battleship-9	75	45			
		22			33	55	battleship-10	75	45			
		22			33	55	battleship-11	75	45			

TABLE B.29: BATTLESHIP UNIT WITH 7 DAMAGE ATTACKING

Damage = 7/12 Attack = 1*+
Shot Damage = 3 Defense = 2
* = 1/2 versus fighters and bombers
+ = crippled

-4	-3	-2	-1	0	ATTACKING BATTLESHIP WINS	DEF.-UNIT TYPE	DEF. UNIT WINS	PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE SUFFERED 0	-3	-6	-9
3	6	13	25	50	97	infantry&	3	3			
6	10	15	22	33	86	infantry*	14	14			
3	6	13	25	50	97	armor	3	3			
3	6	13	25	50	97	armor-1	3	3			
6	10	15	22	33	86	armor+	14	14			
6	10	15	22	33	86	armor-1+	14	14			
8	10	13	16	20	67	fighter	33	33			
13		16		20	49	bomber	51	51			
	25			50	75	submarine	25	25			
	25			50	75	submarine-1	25	25			
3	6	13	25	50	97	transport	3	3			
3	6	13	25	50	97	transport-1	3	3			
3	6	13	25	50	97	transport-2	3	3			
6	10	15	22	33	86	destroyer	14	14			
6	10	15	22	33	86	destroyer-1	14	14			
6	10	15	22	33	86	destroyer-2	14	14			

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-4	-3	-2	-1	0	ATKR. WINS	DEF. TYPE	WINS	0	-3	-6	-9
11	11	10	7	3	42	carrier	58	14	22	22	
11	11	10	7	3	42	carrier-1	58	14	22	22	
11	13	15	14	11	64	carrier-2	36	14	22		
11	13	15	14	11	64	carrier-3	36	14	22		
11	13	15	14	11	64	carrier-4	36	14	22		
6	10	15	22	33	86	carrier-5	14	14			
6	10	15	22	33	86	carrier-6	14	14			
6	10	15	22	33	86	carrier-7	14	14			
10		7		3	20	cruiser	80	30	30	20	
10		7		3	20	cruiser-1	80	30	30	20	
15		14		11	40	cruiser-2	60	30	30		
15		14		11	40	cruiser-3	60	30	30		
15		14		11	40	cruiser-4	60	30	30		
15		22		33	70	cruiser-5	30	30			
15		22		33	70	cruiser-6	30	30			
15		22		33	70	cruiser-7	30	30			

-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
	3			1	4	battleship	96	45	30	15	6
	3			1	4	battleship-1	96	45	30	15	6
	3			1	4	battleship-2	96	45	30	15	6
	7			4	11	battleship-3	89	45	29	15	
	7			4	11	battleship-4	89	45	29	15	
	7			4	11	battleship-5	89	45	29	15	
	14			11	25	battleship-6	75	45	30		
	14			11	25	battleship-7	75	45	30		
	14			11	25	battleship-8	75	45	30		
	22			33	55	battleship-9	75	45			
	22			33	55	battleship-10	75	45			
	22			33	55	battleship-11	75	45			

Table B.30: Battleship Unit with 8 Damage Attacking

Damage = 8/12 Attack = 1*+
Shot Damage = 3 Defense = 2
* = 1/2 versus fighters and bombers
+ = crippled

-3	-2	-1	0	Attacking Battleship Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Suffered 0	-3	-6	-9
6	13	25	50	94	infantry&	6	6			
10	15	22	33	80	infantry*	20	20			
6	13	25	50	94	armor	6	6			
6	13	25	50	94	armor-1	6	6			
10	15	22	33	80	armor+	20	20			
10	15	22	33	80	armor-1+	20	20			
10	13	16	20	59	fighter	41	41			
	16		20	36	bomber	64	64			
25			50	75	submarine	25	25			
25			50	75	submarine-1	25	25			
6	13	25	50	94	transport	6	6			
6	13	25	50	94	transport-1	6	6			
6	13	25	50	94	transport-2	6	6			
10	15	22	33	80	destroyer	20	20			
10	15	22	33	80	destroyer-1	20	20			
10	15	22	33	80	destroyer-2	20	20			

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
11	10	7	3	31	carrier	69	20	27	22	
11	10	7	3	31	carrier-1	69	20	27	22	
13	15	14	11	53	carrier-2	47	20	27		
13	15	14	11	53	carrier-3	47	20	27		
13	15	14	11	53	carrier-4	47	20	27		
10	15	22	33	80	carrier-5	20	20			
10	15	22	33	80	carrier-6	20	20			
10	15	22	33	80	carrier-7	20	20			
	7		4	11	cruiser	89	45	29	15	
	7		4	11	cruiser-1	89	45	29	15	
	14		11	25	cruiser-2	75	45	30		
	14		11	25	cruiser-3	75	45	30		
	14		11	25	cruiser-4	75	45	30		
	22		33	55	cruiser-5	45	45			
	22		33	55	cruiser-6	45	45			
	22		33	55	cruiser-7	45	45			

-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
3			1	4	battleship	96	45	30	15	6
3			1	4	battleship-1	96	45	30	15	6
3			1	4	battleship-2	96	45	30	15	6
7			4	11	battleship-3	89	45	29	15	
7			4	11	battleship-4	89	45	29	15	
7			4	11	battleship-5	89	45	29	15	
14			11	25	battleship-6	75	45	30		
14			11	25	battleship-7	75	45	30		
14			11	25	battleship-8	75	45	30		
22			33	55	battleship-9	75	45			
22			33	55	battleship-10	75	45			
22			33	55	battleship-11	75	45			

TABLE B.31: BATTLESHIP UNIT WITH 9 DAMAGE ATTACKING

Damage = 9/12 Attack = 1*+
Shot Damage = 3 Defense = 2
* = 1/2 versus fighters and bombers
+ = crippled

-2	-1	0	ATTACKING BATTLESHIP WINS	DEF.-UNIT TYPE	DEF. UNIT WINS	PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE SUFFERED 0	-3	-6	-9
13	25	50	88	infantry&	12	12			
15	22	33	70	infantry*	30	30			
13	25	50	88	armor	12	12			
13	25	50	88	armor-1	12	12			
15	22	33	70	armor+	30	30			
15	22	33	70	armor-1+	30	30			
13	16	20	49	fighter	51	51			
16		20	36	bomber	64	64			
		50	50	submarine	50	50			
		50	50	submarine-1	50	50			
13	25	50	88	transport	12	12			
13	25	50	88	transport-1	12	12			
13	25	50	88	transport-2	12	12			
15	22	33	70	destroyer	30	30			
15	22	33	70	destroyer-1	30	30			
15	22	33	70	destroyer-2	30	30			

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-2	-1	0	ATKR. WINS	DEF. TYPE	WINS	0	-3	-6	-9
10	7	3	20	carrier	70	30	30	20	
10	7	3	20	carrier-1	70	30	30	20	
15	14	11	40	carrier-2	60	30	30		
15	14	11	40	carrier-3	60	30	30		
15	14	11	40	carrier-4	60	30	30		
15	22	33	70	carrier-5	30	30			
15	22	33	70	carrier-6	30	30			
15	22	33	70	carrier-7	30	30			
7		4	11	cruiser	89	45	29	15	
7		4	11	cruiser-1	89	45	29	15	
14		11	25	cruiser-2	75	45	30		
14		11	25	cruiser-3	75	45	30		
14		11	25	cruiser-4	75	45	30		
22		33	55	cruiser-5	45	45			
22		33	55	cruiser-6	45	45			
22		33	55	cruiser-7	45	45			

-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
		1	1	battleship	99	67	22	7	3
		1	1	battleship-1	99	67	22	7	3
		1	1	battleship-2	99	67	22	7	3
		4	4	battleship-3	96	67	22	7	
		4	4	battleship-4	96	67	22	7	
		4	4	battleship-5	96	67	22	7	
		11	11	battleship-6	89	67	22		
		11	11	battleship-7	89	67	22		
		11	11	battleship-8	89	67	22		
		33	33	battleship-9	67	67			
		33	33	battleship-10	67	67			
		33	33	battleship-11	67	67			

Table B 32: Battleship Unit with 10 Damage Attacking

Damage = 10/12 Attack = 1*+
Shot Damage = 3 Defense = 2
* = 1/2 versus fighters and bombers
+ = crippled

-1	0	Attacking Battleship Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Suffered 0	-3	-6	-9
25	50	75	infantry&	25	25			
22	33	55	infantry*	45	45			
25	50	75	armor	25	25			
25	50	75	armor-1	25	25			
22	33	55	armor+	45	45			
22	33	55	armor-1+	45	45			
16	20	36	fighter	64	64			
	20	20	bomber	80	80			
	50	50	submarine	50	50			
	50	50	submarine-1	50	50			
25	50	75	transport	25	25			
25	50	75	transport-1	25	25			
25	50	75	transport-2	25	25			
22	33	55	destroyer	45	45			
22	33	55	destroyer-1	45	45			
22	33	55	destroyer-2	45	45			

& infantry/air base
* infantry in woods or mountains
+ armor in woods

-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
7	4	11	carrier	69	45	30	14	
7	4	11	carrier-1	69	45	30	14	
14	11	25	carrier-2	75	45	30		
14	11	25	carrier-3	75	45	30		
14	11	25	carrier-4	75	45	30		
22	33	55	carrier-5	45	45			
22	33	55	carrier-6	45	45			
22	33	55	carrier-7	45	45			
	4	4	cruiser	96	67	22	7	
	4	4	cruiser-1	96	67	22	7	
	11	11	cruiser-2	89	67	22		
	11	11	cruiser-3	89	67	22		
	11	11	cruiser-4	89	67	22		
	33	33	cruiser-5	67	67			
	33	33	cruiser-6	67	67			
	33	33	cruiser-7	67	67			

-1	0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
	1	1	battleship	99	67	22	7	3
	1	1	battleship-1	99	67	22	7	3
	1	1	battleship-2	99	67	22	7	3
	4	4	battleship-3	96	67	22	7	
	4	4	battleship-4	96	67	22	7	
	4	4	battleship-5	96	67	22	7	
	11	11	battleship-6	89	67	22		
	11	11	battleship-7	89	67	22		
	11	11	battleship-8	89	67	22		
	33	33	battleship-9	67	67			
	33	33	battleship-10	67	67			
	33	33	battleship-11	67	67			

TABLE B.33: BATTLESHIP UNIT WITH 11 DAMAGE ATTACKING

Damage = 11/12 Attack = 1*+
Shot Damage = 3 Defense = 2
* = 1/2 versus fighters and bombers
+ = crippled

	ATTACKING BATTLESHIP	DEF.- UNIT	DEF. UNIT	PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE SUFFERED			
0	WINS	TYPE	WINS	0	-3	-6	-9
50	50	infantry&	50	50			
33	33	infantry*	67	67			
50	50	armor	50	50			
50	50	armor-1	50	50			
33	33	armor+	67	67			
33	33	armor-1+	67	67			
20	20	fighter	80	80			
20	20	bomber	80	80			
50	50	submarine	50	50			
50	50	submarine-1	50	50			
50	50	transport	50	50			
50	50	transport-1	50	50			
50	50	transport-2	50	50			
33	33	destroyer	67	67			
33	33	destroyer-1	67	67			
33	33	destroyer-2	67	67			

& infantry/air base
* infantry in woods or mountains
+ armor in woods

	ATKR.	DEF.					
0	WINS	TYPE	WINS	0	-3	-6	-9
4	4	carrier	96	67	22	7	
4	4	carrier-1	96	67	22	7	
11	11	carrier-2	89	67	22		
11	11	carrier-3	89	67	22		
11	11	carrier-4	89	67	22		
33	33	carrier-5	67	67			
33	33	carrier-6	67	67			
33	33	carrier-7	67	67			
4	4	cruiser	96	67	22	7	
4	4	cruiser-1	96	67	22	7	
11	11	cruiser-2	89	67	22		
11	11	cruiser-3	89	67	22		
11	11	cruiser-4	89	67	22		
33	33	cruiser-5	67	67			
33	33	cruiser-6	67	67			
33	33	cruiser-7	67	67			

0	Atkr. Wins	Def. Type	Wins	0	-3	-6	-9
1	1	battleship	99	67	22	7	3
1	1	battleship-1	99	67	22	7	3
1	1	battleship-2	99	67	22	7	3
4	4	battleship-3	96	67	22	7	
4	4	battleship-4	96	67	22	7	
4	4	battleship-5	96	67	22	7	
11	11	battleship-6	89	67	22		
11	11	battleship-7	89	67	22		
11	11	battleship-8	89	67	22		
33	33	battleship-9	67	67			
33	33	battleship-10	67	67			
33	33	battleship-11	67	67			

Table B.34: Carrier Unit Attacking

Damage = 9/8 Attack = 1
Shot Damage = 1 Defense = 2

-7	-6	-5	-4	-3	-2	-1	0	Attacking Carrier Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
2	3	4	7	10	15	22	33	96	fighter	4	4											
	10		15		22		33	80	bomber	20	20											
	19			25			25	69	submarine	31	12	19										
	13			25			50	88	submarine-1	12	12											
4	5	8	12	16	19	19	12	95	transport	5	0	2	3									
1	3	5	8	12	19	25	25	98	transport-1	2	0	2										
0	1	2	3	6	13	25	50	100	transport-2	0	0											
8	9	10	11	11	10	7	3	69	destroyer	31	4	11	16									
5	7	9	11	13	15	14	11	85	destroyer-1	15	4	11										
2	3	4	7	10	15	22	33	96	destroyer-2	4	4											

-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
3	2	1	1	1	0	0	0	8	carrier	92	4	11	16	17	16	13	9	6				
4	3	3	2	1	1	0	0	14	carrier-1	86	4	11	16	17	16	13	9					
6	5	4	3	2	1	0	0	23	carrier-2	77	4	11	16	17	16	13						
8	7	7	6	4	3	1	0	36	carrier-3	64	4	11	16	17	16							
9	9	9	9	7	5	3	1	52	carrier-4	48	4	11	16	17								
8	9	10	11	11	10	7	3	69	carrier-5	31	4	11	16									
5	7	9	11	13	15	14	11	85	carrier-6	15	4	11										
2	3	4	7	10	15	22	33	96	carrier-7	4	4											
	1		0		0		0	1	cruiser	99	20	27	22	15	8	4	2	1				
	1		1		0		0	2	cruiser-1	98	20	27	22	15	8	4	2					
	2		1		1		0	4	cruiser-2	96	20	27	22	15	8	4						
	4		3		1		0	8	cruiser-3	92	20	27	22	15	8							
	7		6		3		1	17	cruiser-4	83	20	27	22	14								
	11		10		7		3	31	cruiser-5	69	20	27	22									
	13		15		14		11	53	cruiser-6	47	20	27										
	10		15		22		33	80	cruiser-7	20	20											

-7	-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
	0			0			0	0	battleship	100	30	30	20	11	5	2	1	0	0	0	0	0
	0			0			0	0	battleship-1	100	30	30	20	11	5	2	1	0	0	0	0	
	0			0			0	0	battleship-2	100	30	30	20	11	5	2	1	0	0	0		
	0			0			0	0	battleship-3	100	30	30	20	11	5	2	1	0	0			
	0			0			0	0	battleship-4	100	30	30	20	11	5	2	1	0				
	1			0			0	1	battleship-5	99	30	30	19	11	5	2	1					
	1			1			0	2	battleship-6	98	30	30	19	11	5	2						
	3			1			0	4	battleship-7	96	30	30	19	11	5							
	6			3			1	10	battleship-8	90	30	30	19	11								
	10			7			3	20	battleship-9	80	30	30	20									
	15			14			11	40	battleship-10	60	30	30										
	15			22			33	70	battleship-11	30	30											

TABLE B.35: CARRIER UNIT WITH 1 DAMAGE ATTACKING

Damage = 1/8 Attack = 1
Shot Damage = 1 Defense = 2

-6	-5	-4	-3	-2	-1	0	Attacking Carrier Wins	Def.-Unit Type	Def. Unit Wins	Def. Percentage Chance for This Unit Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
3	4	7	10	15	22	33	94	fighter	6	6											
10		15		22		33	80	bomber	20	20											
19			25			25	69	submarine	31	12	19										
13			25			50	88	submarine-1	12	12											
5	8	12	16	19	19	12	91	transport	9	1	3	5									
3	4	8	12	19	25	25	96	transport-1	4	1	3										
1	2	3	6	12	25	50	99	transport-2	1	1											
9	10	11	11	10	7	3	61	destroyer	39	6	14	19									
7	9	11	13	15	14	11	80	destroyer-1	20	6	14										
3	4	7	10	15	22	33	94	destroyer-2	6	6											

-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
2	1	1	1	0	0	0	5	carrier	95	6	14	18	18	15	11	7	4				
3	3	2	1	1	0	0	10	carrier-1	90	6	14	19	18	15	11	7					
5	4	3	2	1	0	0	17	carrier-2	83	6	14	19	18	15	11						
7	7	6	4	3	1	0	28	carrier-3	72	6	14	19	18	15							
9	9	9	7	5	3	1	43	carrier-4	57	6	14	19	18								
9	10	11	11	10	7	3	61	carrier-5	29	6	14	19									
7	9	11	13	15	14	11	80	carrier-6	20	6	14										
3	4	7	10	15	22	33	94	carrier-7	6	6											
1		0		0		0	1	cruiser	99	20	27	22	15	8	4	2	1				
1		1		0		0	2	cruiser-1	98	20	27	22	15	8	4	2					
2		1		1		0	4	cruiser-2	96	20	27	22	15	8	4						
4		3		1		0	8	cruiser-3	92	20	27	22	15	8							
7		6		3		1	17	cruiser-4	83	20	27	22	14								
11		10		7		3	31	cruiser-5	69	20	27	22									
13		15		14		11	53	cruiser-6	47	20	27										
10		15		22		33	80	cruiser-7	20	20											

-6	-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0			0			0	0	battleship	100	30	30	20	11	5	2	1	0	0	0	0	0
0			0			0	0	battleship-1	100	30	30	20	11	5	2	1	0	0	0	0	
0			0			0	0	battleship-2	100	30	30	20	11	5	2	1	0	0	0		
0			0			0	0	battleship-3	100	30	30	20	11	5	2	1	0	0			
0			0			0	0	battleship-4	100	30	30	20	11	5	2	1	0				
1			0			0	1	battleship-5	99	30	30	19	11	5	2	1					
1			1			0	2	battleship-6	98	30	30	19	11	5	2						
3			1			0	4	battleship-7	96	30	30	19	11	5							
6			3			1	10	battleship-8	90	30	30	19	11								
10			7			3	20	battleship-9	80	30	30	20									
15			14			11	40	battleship-10	60	30	30										
15			22			33	70	battleship-11	30	30											

Table B.36: Carrier Unit with 2 Damage Attacking

Damage = 2/8
Shot Damage = 1

Attack = 1
Defense = 2

-5	-4	-3	-2	-1	0	Attacking Carrier Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
4	7	10	15	22	33	91	fighter	9	9											
	15		22		33	70	bomber	30	30											
		25			25	50	submarine	50	25	25										
		25			50	75	submarine-1	25	25											
8	12	16	19	19	12	86	transport	14	1	5	8									
5	8	12	19	25	25	94	transport-1	6	1	5										
2	3	6	12	25	50	98	transport-2	2	2											
10	11	11	10	7	3	52	destroyer	48	9	18	21									
9	11	13	15	14	11	73	destroyer-1	27	9	18										
4	7	10	15	22	33	91	destroyer-2	9	9											

-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
1	1	1	0	0	0	3	carrier	97	9	18	21	18	14	9	5	3				
3	2	1	0	0	0	6	carrier-1	94	9	18	21	18	14	9	5					
4	3	2	1	0	0	12	carrier-2	88	9	18	21	18	14	9						
7	6	4	3	1	0	21	carrier-3	79	9	18	21	18	14							
9	9	7	5	3	1	34	carrier-4	66	9	18	21	18								
10	11	11	10	7	3	52	carrier-5	48	9	18	21									
9	11	13	15	14	11	73	carrier-6	27	9	18										
4	7	10	15	22	33	91	carrier-7	9	9											
	0		0		0	0	cruiser	100	30	30	20	11	5	2	1	1				
	1		0		0	1	cruiser-1	99	30	30	20	11	5	2	1					
	1		1		0	2	cruiser-2	98	30	30	20	11	5	2						
	3		1		0	4	cruiser-3	96	30	30	20	11	5							
	6		3		1	10	cruiser-4	90	30	30	19	11								
	10		7		3	20	cruiser-5	80	30	30	20									
	15		14		11	40	cruiser-6	60	30	30										
	15		22		33	70	cruiser-7	30	30											

-5	-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
		0			0	0	battleship	100	45	30	15	6	3	1	0	0	0	0	0	0
		0			0	0	battleship-1	100	45	30	15	6	3	1	0	0	0	0	0	
		0			0	0	battleship-2	100	45	30	15	6	3	1	0	0	0	0		
		0			0	0	battleship-3	100	45	30	15	6	3	1	0	0	0			
		0			0	0	battleship-4	100	45	30	15	6	3	1	0	0				
		0			0	0	battleship-5	100	45	30	15	6	3	1	0					
		1			0	1	battleship-6	99	45	30	15	6	2	1						
		1			1	2	battleship-7	98	45	30	15	6	2							
		3			1	4	battleship-8	96	45	30	15	6								
		7			3	10	battleship-9	90	45	30	15									
		14			11	25	battleship-10	75	45	30										
		22			33	55	battleship-11	45	45											

TABLE B.37: CARRIER UNIT WITH 3 DAMAGE ATTACKING

Damage = 3/8 Attack = 1
Shot Damage = 1 Defense = 2

-4	-3	-2	-1	0	Attacking Carrier Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
6	10	15	22	33	86	fighter	14	14											
15		22		33	70	bomber	30	30											
	25			25	50	submarine	50	25	25										
	25			50	75	submarine-1	25	25											
12	15	19	19	12	77	transport	23	3	8	12									
8	12	19	25	25	89	transport-1	11	3	8										
3	6	12	25	50	97	transport-2	3	3											
11	11	10	7	3	42	destroyer	58	14	22	22									
11	13	15	14	11	64	destroyer-1	36	14	22										
6	10	15	22	33	86	destroyer-2	14	14											

-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
1	1	0	0	0	2	carrier	98	13	22	22	17	11	7	4	2				
2	1	1	0	0	4	carrier-1	96	13	22	22	17	11	7	4					
3	2	1	0	0	8	carrier-2	92	13	22	22	17	11	7						
6	4	3	1	0	14	carrier-3	86	13	22	22	17	11							
9	7	5	3	1	25	carrier-4	75	13	22	22	17								
11	11	10	7	3	42	carrier-5	58	14	22	22									
11	13	15	14	11	64	carrier-6	36	14	22										
6	10	15	22	33	86	carrier-7	14	14											
0		0		0	0	cruiser	100	30	30	20	11	5	2	1	1				
1		0		0	1	cruiser-1	99	30	30	20	11	5	2	1					
1		1		0	2	cruiser-2	98	30	30	20	11	5	2						
3		1		0	4	cruiser-3	96	30	30	20	11	5							
6		3		1	10	cruiser-4	90	30	30	19	11								
10		7		3	20	cruiser-5	80	30	30	20									
15		14		11	40	cruiser-6	60	30	30										
15		22		33	70	cruiser-7	30	30											

-4	-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
	0			0	0	battleship	100	45	30	15	6	3	1	0	0	0	0	0	0
	0			0	0	battleship-1	100	45	30	15	6	3	1	0	0	0	0	0	
	0			0	0	battleship-2	100	45	30	15	6	3	1	0	0	0	0		
	0			0	0	battleship-3	100	45	30	15	6	3	1	0	0	0			
	0			0	0	battleship-4	100	45	30	15	6	3	1	0	0				
	0			0	0	battleship-5	100	45	30	15	6	3	1	0					
	1			0	1	battleship-6	99	45	30	15	6	2	1						
	1			1	2	battleship-7	98	45	30	15	6	2							
	3			1	4	battleship-8	96	45	30	15	6								
	7			3	10	battleship-9	90	45	30	15									
	14			11	25	battleship-10	75	45	30										
	22			33	55	battleship-11	45	45											

Table B.38: Carrier Unit with 4 Damage Attacking

Damage = 4/8 Attack = 1/2+
Shot Damage = 1 Defense = 2
+ = crippled

-3	-2	-1	0	Attacking Carrier Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
10	13	16	20	59	fighter	41	41											
	16		20	36	bomber	64	64											
14			11	25	submarine	75	45	30										
22			33	55	submarine-1	45	45											
11	9	7	4	31	transport	69	20	27	22									
13	15	14	11	53	transport-1	47	20	27										
10	15	22	33	80	transport-2	20	20											
4	3	2	1	10	destroyer	90	41	33	16									
8	8	6	4	26	destroyer-1	74	41	33										
10	13	16	20	59	destroyer-2	41	41											

-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	0	0	0	carrier	100	41	33	16	7	2	1	0	0				
0	0	0	0	0	carrier-1	100	41	33	16	7	2	1	0					
0	0	0	0	0	carrier-2	100	41	33	16	7	2	1						
1	0	0	0	1	carrier-3	99	41	33	16	7	2							
2	1	0	0	3	carrier-4	97	41	33	16	7								
4	3	2	1	10	carrier-5	90	41	33	16									
8	8	6	4	26	carrier-6	74	41	33										
10	13	16	20	59	carrier-7	41	41											
	0		0	0	cruiser	100	64	25	8	2	1	0	0	0				
	0		0	0	cruiser-1	100	64	25	8	2	1	0	0					
	0		0	0	cruiser-2	100	64	25	8	2	1	0						
	0		0	0	cruiser-3	100	64	25	8	2	1							
	1		0	1	cruiser-4	99	64	25	8	2								
	2		1	1	cruiser-5	97	64	25	8									
	6		4	10	cruiser-6	90	64	26										
	16		20	36	cruiser-7	64	64											

-3	-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0			0	0	battleship	100	64	25	8	2	1	0	0	0	0	0	0	0
0			0	0	battleship-1	100	64	25	8	2	1	0	0	0	0	0	0	
0			0	0	battleship-2	100	64	25	8	2	1	0	0	0	0	0		
0			0	0	battleship-3	100	64	25	8	2	1	0	0	0	0			
0			0	0	battleship-4	100	64	25	8	2	1	0	0	0				
0			0	0	battleship-5	100	64	25	8	2	1	0	0					
0			0	0	battleship-6	100	64	25	8	2	1	0						
0			0	0	battleship-7	100	64	25	8	2	1							
1			0	1	battleship-8	99	64	25	8	2								
2			1	3	battleship-9	97	64	25	8									
6			4	10	battleship-10	90	64	26										
16			20	36	battleship-11	64	64											

TABLE B.39: CARRIER UNIT WITH 5 DAMAGE ATTACKING

Damage = 5/8 Attack = 1/2+
Shot Damage = 1 Defense = 2
+ = crippled

-2	-1	0	ATTACKING CARRIER WINS	DEF.-UNIT TYPE	DEF. UNIT WINS	PERCENTAGE CHANCE FOR THIS AMOUNT OF DAMAGE INFLICTED 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
13	16	20	49	fighter	51	51											
16		20	36	bomber	64	64											
		11	11	submarine	89	64	25										
		33	33	submarine-1	67	67											
10	7	3	20	transport	80	30	30	20									
15	14	11	40	transport-1	60	30	30										
15	22	33	70	transport-2	30	30											
3	2	1	6	destroyer	94	51	31	12									
8	6	4	18	destroyer-1	62	51	31										
13	16	20	49	destroyer-2	51	51											

-2	-1	0	ATKR. WINS	DEF. TYPE	WINS	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	0	0	carrier	100	51	31	12	4	1	1	0	0				
0	0	0	0	carrier-1	100	51	31	12	4	1	1	0					
0	0	0	0	carrier-2	100	51	31	12	4	1	1						
0	0	0	0	carrier-3	100	51	31	13	4	1							
1	1	0	2	carrier-4	98	51	31	12	4								
3	2	1	6	carrier-5	94	51	31	12									
8	6	4	18	carrier-6	62	51	31										
13	16	20	49	carrier-7	51	51											
0		0	0	cruiser	100	64	25	8	2	1	0	0	0				
0		0	0	cruiser-1	100	64	25	8	2	1	0	0					
0		0	0	cruiser-2	100	64	25	8	2	1	0						
0		0	0	cruiser-3	100	64	25	8	2	1							
1		0	1	cruiser-4	99	64	25	8	2								
2		1	1	cruiser-5	97	64	25	8									
6		4	10	cruiser-6	90	64	26										
16		20	36	cruiser-7	64	64											

-2	-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
		0	0	battleship	100	80	16	3	1	0	0	0	0	0	0	0	0
		0	0	battleship-1	100	80	16	3	1	0	0	0	0	0	0	0	
		0	0	battleship-2	100	80	16	3	1	0	0	0	0	0	0		
		0	0	battleship-3	100	80	16	3	1	0	0	0	0	0			
		0	0	battleship-4	100	80	16	3	1	0	0	0	0				
		0	0	battleship-5	100	80	16	3	1	0	0	0					
		0	0	battleship-6	100	80	16	3	1	0	0						
		0	0	battleship-7	100	80	16	3	1	0							
		0	0	battleship-8	100	80	16	3	1								
		1	1	battleship-9	99	80	16	3									
		4	4	battleship-10	96	80	16										
		20	20	battleship-11	80	80											

Table B.40: Carrier Unit with 6 Damage Attacking

Damage = 6/8 Attack = 1/2+
Shot Damage = 1 Defense = 2
+ = crippled

-1	0	Attacking Carrier Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
16	20	36	fighter	64	64											
	20	20	bomber	80	80											
	11	11	submarine	89	64	25										
	33	33	submarine-1	67	67											
7	3	10	transport	90	45	30	15									
14	11	25	transport-1	75	45	30										
22	33	55	transport-2	45	45											
2	1	3	destroyer	97	64	25	8									
6	4	10	destroyer-1	90	64	26										
16	20	36	destroyer-2	64	64											

-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	0	carrier	100	64	25	8	2	1	0	0	0				
0	0	0	carrier-1	100	64	25	8	2	1	0	0					
0	0	0	carrier-2	100	64	25	8	2	1	0						
0	0	0	carrier-3	100	64	25	8	2	1							
1	0	1	carrier-4	99	64	25	8	2								
2	1	1	carrier-5	97	64	25	8									
6	4	10	carrier-6	90	64	26										
16	20	36	carrier-7	64	64											
	0	0	cruiser	100	80	16	3	1	0	0	0	0				
	0	0	cruiser-1	100	80	16	3	1	0	0	0					
	0	0	cruiser-2	100	80	16	3	1	0	0						
	0	0	cruiser-3	100	80	16	3	1	0							
	0	0	cruiser-4	100	80	16	3	1								
	1	1	cruiser-5	99	80	16	3									
	4	4	cruiser-6	96	80	16										
	16	16	cruiser-7	80	80											

-1	0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
	0	0	battleship	100	80	16	3	1	0	0	0	0	0	0	0	0
	0	0	battleship-1	100	80	16	3	1	0	0	0	0	0	0	0	
	0	0	battleship-2	100	80	16	3	1	0	0	0	0	0	0		
	0	0	battleship-3	100	80	16	3	1	0	0	0	0	0			
	0	0	battleship-4	100	80	16	3	1	0	0	0	0				
	0	0	battleship-5	100	80	16	3	1	0	0	0					
	0	0	battleship-6	100	80	16	3	1	0	0						
	0	0	battleship-7	100	80	16	3	1	0							
	0	0	battleship-8	100	80	16	3	1								
	1	1	battleship-9	99	80	16	3									
	4	4	battleship-10	96	80	16										
	20	20	battleship-11	80	80											

TABLE B.41: CARRIER UNIT WITH 7 DAMAGE ATTACKING

Damage = 7/8 Attack = 1/2+
Shot Damage = 1 Defense = 2
+ = crippled

0	Attacking Carrier Wins	Def.-Unit Type	Def. Unit Wins	Percentage Chance for This Amount of Damage Inflicted 0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
20	20	fighter	80	80											
20	20	bomber	80	80											
11	11	submarine	89	64	25										
33	33	submarine-1	67	67											
4	4	transport	97	67	22	7									
11	11	transport-1	89	67	22										
33	33	transport-2	67	67											
1	1	destroyer	99	80	16	3									
4	4	destroyer-1	96	80	16										
20	20	destroyer-2	80	80											

0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	carrier	100	80	16	3	1	0	0	0	0				
0	0	carrier-1	100	80	16	3	1	0	0	0					
0	0	carrier-2	100	80	16	3	1	0	0						
0	0	carrier-3	100	80	16	3	1	0							
0	0	carrier-4	100	80	16	3	1								
1	1	carrier-5	99	80	16	3									
4	4	carrier-6	96	80	16										
16	16	carrier-7	80	80											
0	0	cruiser	100	80	16	3	1	0	0	0	0				
0	0	cruiser-1	100	80	16	3	1	0	0	0					
0	0	cruiser-2	100	80	16	3	1	0	0						
0	0	cruiser-3	100	80	16	3	1	0							
0	0	cruiser-4	100	80	16	3	1								
1	1	cruiser-5	99	80	16	3									
4	4	cruiser-6	96	80	16										
16	16	cruiser-7	80	80											

0	Atkr. Wins	Def. Type	Wins	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
0	0	battleship	100	80	16	3	1	0	0	0	0	0	0	0	0
0	0	battleship-1	100	80	16	3	1	0	0	0	0	0	0	0	
0	0	battleship-2	100	80	16	3	1	0	0	0	0	0	0		
0	0	battleship-3	100	80	16	3	1	0	0	0	0	0			
0	0	battleship-4	100	80	16	3	1	0	0	0	0				
0	0	battleship-5	100	80	16	3	1	0	0	0					
0	0	battleship-6	100	80	16	3	1	0	0						
0	0	battleship-7	100	80	16	3	1	0							
0	0	battleship-8	100	80	16	3	1								
1	1	battleship-9	99	80	16	3									
4	4	battleship-10	96	80	16										
20	20	battleship-11	80	80											

Project AI

by Mark Lewis Baldwin and Bob Rakosky

INTRODUCTION

When designing an artificial intelligence (AI) for a strategy game, one must keep clearly in mind the final goal, i.e., winning the game. (Actually, the goal is to entertain the customer, but the subgoal of trying to win the game seems more appropriate here.) Normally, winning the game is accomplished by reaching a set of victory conditions. To achieve these victory conditions, the computer needs to control a divergent set of resources (units and other elements) in a coordinated and sophisticated manner.

In order to give a frame of reference for this discussion, we will be discussing Project AI from the point of view of a strategic wargame that has multiple unit types. Each player needs to make a separate movement decision on each turn of game play. However, this system is not restricted to wargames. It's applicable in any game in which a large number of decisions have to be made controlling a number of resources that work best in coordination with each other.

There are a number of ways to approach the problem, and what will be discussed is by no means the only approach. Project AI is a methodology that allows the computer to solve this problem at a strategic as well as tactical level. But first, we need to build up to it by discussing the levels of AI decision-making on which it is based. Each level described below is built on its previous levels, if any.

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FIRST LEVEL

Approach: On each turn (or cycle), examine each unit to be moved (i.e., node of decision making), build a list of possible decisions, and pick one randomly. In other words, look around and move somewhere. It doesn't matter what you move or where you move it. Note that an action of doing nothing is still an action.

Problems: Other than at a noise level, this does not direct the computer AI's resources toward the goal of victory. It will, however, confuse the opponent something awful.

SECOND LEVEL

Approach: When selecting from possible moves (the decision list) for each unit, pick the move that achieves the victory conditions. To be specific, look around. Are there any victory goals achievable by the unit (i.e., can the unit move into a victory location)? If so, implement it.

Problem: When there are multiple actions that achieve the same goal, there is no filter for differentiating equal (or nearly equal) actions. Also, most victory conditions cannot be achieved by any one decision, therefore we are placed back to the first level.

THIRD LEVEL

Approach: Evaluate each alternate move for a unit by how well it moves us toward the final victory goal. Each move needs to be evaluated not as a true/false but as a numeric value, and analyzed in terms of how well the target victory goal is reached. For example, an action that would move to a victory location in two turns is worth more than an action that would move to a victory location in 20 turns.

Problems: This method does not allow for actions that will support reaching the final victory conditions but, in and of themselves, do not achieve victory (i.e., killing another unit when that is not part of the victory goals).

FOURTH LEVEL

Approach: Define specific subgoals that assist the artificial intelligence in achieving the victory conditions but, in and of themselves, are not victory conditions. When a unit is making a decision, it evaluates the possibility of achieving these subgoals. Such subgoals might include killing enemy units, protecting friendly units, maintaining a defensive line, achieving a strategic position, etc. Accomplishment of each of the subgoals is then factored into the evaluation of the decision tree. A decision is then made. This process can actually produce a semi-intelligible game.

Problems: Each unit makes its decisions independent of all others. It's like pre-Napoleonic warfare. It works well until the opponent starts coordinating his or her forces.

FIFTH LEVEL

Approach: Allow a unit that is making decisions to examine the decisions of other friendly units when weighing its own decision. Weigh the possible outcomes of the other units' planned actions, and balance those results with the current unit's decision tree.

Problems: This allows for coordination but not for strategic control of resources. However, this level is actually beyond what many computer AIs do today. It can also lead to iterative cycling, in which each unit modifies its decision based on the others, in a vicious circle.

SIXTH LEVEL

Approach: Create a strategic (or grand tactical) decision making structure that can control units in a coordinated manner.

Problem: How does one coordinate diverse resources to reach a number of sub–victory goals? This question may be described as strategic-level decision-making. One solution would be to look at how the problem is solved in reality, i.e., on the battlefield or in business.

The solution on the battlefield is to create several layers of hierarchical command and control. For example, squads 1, 2, and 3 are controlled by Company A, which itself is controlled by a higher layer of the hierarchy. Communication mostly goes up the hierarchy (information about a squad 20 miles away is not relayed down to the local squad), while control mostly goes down the hierarchy. On occasion, information and control can cross the hierarchy, and although this happens more now than 50 years ago, it is still relatively infrequent.

As a result, the lowest-level unit must depend on its hierarchical commander to make strategic decisions. It cannot make such decisions itself because: (a) it doesn't have as much information to make such a decision with as does its commander, and (b) it is capable of making a decision based on known data different from one made by other units that have the same data, which cause chaos instead of coordination.

Solutions to the Sixth-Level Problem

Okay, here is the first-cut solution. We build our own hierarchical control system, assigning units to theoretical larger units or in the case where the actual command/control system is modeled (as in the V for Victory series of games), the actual larger units. Allow these "headquarters" to control their commands and work with other headquarters in some type of "megaunit". These in turn could report to and be controlled by some larger unit.

Note that this was actually my first approach to the problem. But there seem to be some difficulties here. The hierarchical command system modeled on the real world does not make optimal use of player resources. Because of the hierarchical structure, too many resources may be assigned to a specific task, or resources in parallel hierarchies will not cooperate.

For example, two units might be able to easily capture a victory location that they are near, but because they each belong to a separate command hierarchy (megaunit) they will not coordinate to do so; but if by chance they did belong to the same hierarchy, they would be able to accomplish the task. In other words, this artificial structure can be too constraining and might produce suboptimal results. And the human player does not have these constraints.

First, we have to ask ourselves, if the hierarchical command-and-control structure is not the best solution, why is it used by business and the military? The difference is in the realities of the situations. As we previously pointed out, on the battlefield, information known at one point in the decision-making structure might not be known at another point in the hierarchy.

In addition, even if all information were known everywhere, identical decisions might not be made from the same data. However, in

game play, there is only one decision maker (either the human or the AI), and all information known is known by that decision maker. This gives the decision maker much more flexibility on controlling and coordinating his or her resources than does the military hierarchy.

In other words, the military and business system of strategic decision-making is not our best model. It exists as a solution because of constraints on communication. But those constraints do not exist in strategy games (command and control is perfect), and therefore modeling military command-and-control decision-making is not our perfect model to solve the problem in game-play AI.

We want the best technique of decision making that we can construct for our AI. So, below is an alternative Sixth Level attack on the problem.

PROJECT AI (LEVEL-SIX ALTERNATIVE)

This leads us to a technique that we call Project AI. Project AI is a methodology that extrapolates the military hierarchical control system into something much more flexible.

The basic idea behind Project AI is to create a temporary megaunit control structure (called a project) designed to accomplish a specific task. Units (resources) are assigned to the project on an as-needed basis, used to accomplish the project, and then released when not required. Projects exist temporarily to accomplish a specific task, and then are released.

Therefore, as we cycle through the decision making process of each unit, we examine the project the unit is assigned to (if it is assigned to one). The project then contains the information needed for the unit to accomplish its specific goal within the project structure.

Note that these goals are not the final victory conditions of the game, but very specific subgoals that can lead to game victory. Capturing a victory location is an obvious goal here, but placing a unit in a location with a good line of sight could also be a goal, although less valuable.

Project AI Details

Let's get a little more into the nitty gritty of the structure of such projects and how they would interact.

What are some possible characteristics of a project?

- **Type of project**—What is the project trying to accomplish? Examples are to defend a city, kill an enemy unit, capture a geographical location, etc. Others are listed below:

  Project-type examples:

  * Kill an enemy unit
  * Capture a location
  * Protect a location
  * Protect another unit
  * Invade a region

- **Specifics of the project**—Exactly what are the specifics for the project? Examples are "kill the 239 Panzer Division," "capture the town of St. Vith," etc.
- **Priority of the project**—How important is the project, compared with other ongoing projects, for winning final victory? This priority is used in general prioritizing and in killing off low-priority projects should there be computer-memory constraints.
- **Formula for calculating the incremental value of assigning a unit to a project**—In other words, given a unit and a large number

of projects, how do we discern to what project to assign the unit. This formula might take into account many different factors including how effective the unit might be on this project, how quickly the unit can be brought in to support the project, what other resources have already been allocated to the project, what is the value of the project, etc. In practice, we have associated the formula with the project type, and each project has carried specific constants that are plugged into the formula. Such constants might include enemy forces opposing the project, minimum forces required to accomplish the project, and probability of success.

- **A list of units assigned to the project.**
- **Other secondary data.**

Putting Project AI to Work

Okay, now how do we actually use these "projects?" Here is one approach:

1. For every turn, examine the domain for possible projects, update the data on current projects, delete old projects that no longer apply or have too low a priority to be of value, and initialize new projects that present themselves. For example, we have just spotted a unit threatening one of our towns, so we create a new project, which is to defend the town, or if this project already existed, when considering the new threat, we might have to re-evaluate the project's value and the resources it required.
2. "Walk through" all units one at a time, assigning each unit to that project that gives the best incremental value for the unit. Note, that this actually may take an iterative process since assigning/releasing units to a project can actually change the value of assigning other units to a project. Also, some projects may not receive enough resources to accomplish their goals. This will cause them to release the resources previously assigned to them.
3. Reprocess all units, designing their specific move orders, taking into account what project they are assigned to and what other units also assigned to the project are planning to do. Again, this may be an iterative process.

The result of this project structure is a very flexible floating structure that allows units to coordinate with each other to meet specific goals. Once the goals have been met, the resources can be reconfigured to meet other goals as they appear during the game.

Keeping to the Task

One of the implementation problems that Project AI can generate is that of oscillations of units between projects. In other words, a unit gets assigned to one project on one turn, thus making a competing project more important, the result of which the unit is grabbed on the next turn, etc. This can result in a unit wandering between two goals and never getting to either.

The designer needs to be aware of this possibility and protect for it. Although there can be several specific solutions to the problem, there is at least one generic solution. Previously, we mentioned a formula for calculating the incremental value of adding a unit to a project. The solution lies in this formula.

To be specific, a weight should be added to the formula if a unit is "looking at" a project to which it is already assigned (i.e., a preference is given to remaining with a project instead of

jumping projects). The key problem here is assigning a weight large enough that it stops the oscillation problem, but small enough that it doesn't prevent necessary jumps between projects. So, one may have to change the weights several times before a satisfactory value is achieved.

SEVENTH LEVEL

One can extrapolate past the project structure just as we built up to it. One extrapolation might be a multilayer level of projects and subprojects. There are other possibilities as well to explore. That, however, remains for the future.

Designing for Play-by Modem

by Mark Lewis Baldwin and Bob Rakosky

INTRODUCTION

One of the ways in that our target audience has changed in recent years is that many more entertainment-software enthusiasts have expanded beyond their solitary computer system and discovered the world of telecommunications. This provides us, as designers of games, with both an opportunity and a challenge. How can we make use of this available technology to enhance our products while still appealing to our current customer base? You will note that we are focusing on modem-capability as an enhancement to, as opposed to the basis of, the design of a game.

We will be raising issues and concerns that are best considered early in the project, while the design is still flexible. While we may know some of the proper questions to be asked, we most definitely do not claim to know the answers to these questions. There are as many answers to the questions as there are game designs, and each project will have its own requirements that need addressing. However, we will discuss decisions as they applied to our two current products, The *Perfect General* and *Empire Deluxe*, both of which support optional play-by-modem capabilities.

WHY SHOULD I ADD PLAY-BY-MODEM CAPABILITY?

Games that present a conflict between two or more players (either human- or computer-controlled) provide a wonderful opportunity for a multiple-

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player option. The ability to play against another human being adds a richness of conflict, cunning, and variability that is difficult at best to achieve with an Artificial Opponent. This adds to the richness of your product and to the entertainment value (potentially) received by your customer. This makes for a happy (and repeat) customer.

Unless you are designing a game that will require a second human player, it is important to keep in mind that your primary focus in the design must still target the solitary player sitting at his computer and playing the game against a computer-controlled opponent. Play-by-modem should not be used to compensate for a poor solitaire game, but can enhance it. It will generate sales, because it is one more marketing hook. We have talked with customers who decided to purchase a game because it has the ability to play by modem, even though they do not ever play the game in that mode. Someday they might, and that will assist in making those borderline sales. We have never spoken with someone who has not purchased a game because it had this option.

Our industry generates a lot of sales via word-of-mouth recommendations. The folks who are our biggest promoters are our customers, and the ones that like to offer advice tend to be the ones who are actively pursuing the telecommunications channels, either via local Bulletin Board Systems or via the national networks like CompuServe and GEnie. These are the people to whom the modem capabilities will most appeal, and these are the people who will influence the most potential customers. When Joe User purchases (and enjoys) the game and sees that it has PBM (play-by-modem) potential, he is more likely to urge his buddies to also purchase the game so that he can play the game with them.

WHY SHOULDN'T I ADD PLAY-BY-MODEM CAPABILITY?

Adding modem capability to a game is an expensive process from development, testing, and support perspectives. Developing the supporting layers of software is nontrivial, and is generally more time-consuming than work on the "self-contained on one machine" portions of the code. The developer really needs to have access to two machines in close proximity to each other in order to be able to do initial unit testing/debugging. Using debuggers in such circumstances can be quite tricky, especially where timing issues are critical on both machines when run concurrently.

The burden on the testing department is also much higher. The modem connection abilities are yet another major area of a program that require extensive testing, and the manpower requirements for this testing cycle are double (or more) the requirements of the single-player testing phases. Additionally, the process of identification of reproducible precipitating events is much more complex, because it involves the coordination of the two (or more) testers involved to attempt to recreate their actions. Particularly in the area of timing-related problems, this is quite difficult.

Finally, the burden on the customer-support staff is much higher. Not only will they have to be experts on the intricacies of the game product and the idiosyncrasies of the underlying operating system, now they will have to be telecommunications experts as well. Particularly in the MS-DOS world, this is a nontrivial task. The most technically proficient of us have difficulty understanding COM-ports and IRQs and modem differences. Problems will occur with many customers simply from hardware configuration issues, and this must be dealt with by the customer-service people.

From our perspective as developers, it does appear that the benefits do outweigh the costs. We are convinced that the modem-capability of *The Perfect General* contributed a lot to the success of that product. We have absolutely no regrets concerning that decision. As for *Empire Deluxe*, it is still too early to make that assessment, because it has only been shipping for less than two months.

Now that we've decided to take the plunge, let's examine some of the basic design decisions that we must confront.

PEER-TO-PEER OR MASTER/SLAVE?

When considering the connecting of two computer systems to work together, we have two basic design options. In the master/slave configuration, one computer system (the master) is totally responsible for all of the matters of controlling the game, while the second system (the slave) merely executes the master's wishes. The second system, as a "dumb terminal" or presentation front-end server, is reduced to basically being remote eyes and ears for the master. Its only function is to present the remote player with the various display elements of the game and solicit input (i.e., commands) from the player on that system.

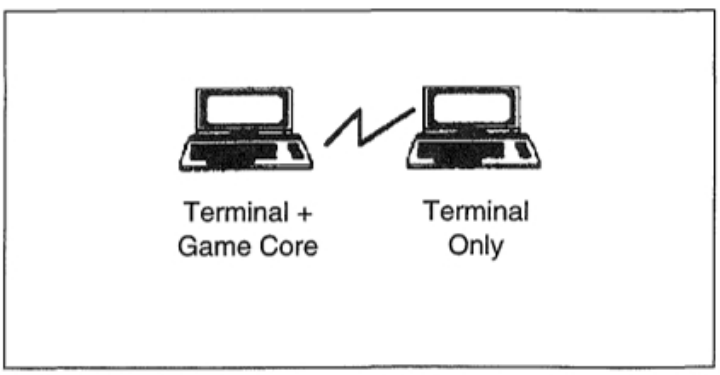

Figure D.1 Master/slave configuration

This configuration simplifies the job of the developer. Only one computer program is really running the game. There is no issue of synchronization of either data or process required. The remote player is not even required to have the complete game system available on his computer, but only requires a "slave-driver" portion that knows how to present the information and prompt for commands.

The major disadvantage of this design is that the remote player cannot get instantaneous feedback for the commands entered. They will have to wait while the command is transmitted to the master system, evaluated and possibly processed, and the resulting feedback transmitted back to their computer for display. This can be a significant problem, because our belief is that any "wait time" detracts from the enjoyment of the game system.

Peer-to-Peer

As an alternative, consider a configuration where both computers are considered equal, sharing the demands of running the game system. In a peer-to-peer architecture, both computers have full knowledge of the game's current state and rules. We are relying on both systems to be able to evaluate and process user-commands.

While this architecture allows for quicker

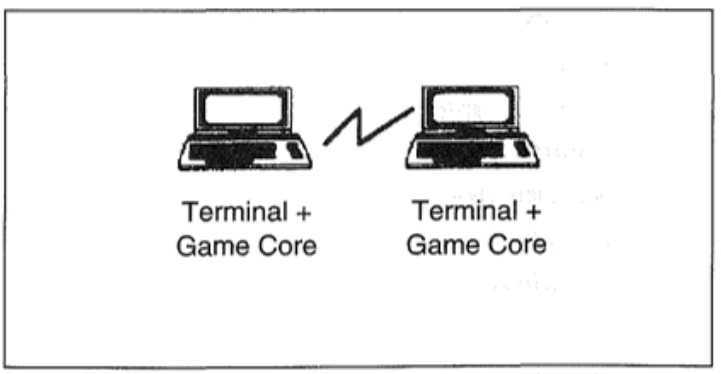

Figure D.2 Peer-to-peer configuration

feedback for the user, it presents many more problems to the designer/developer. Synchronization between the two computer systems becomes a much more important issue. Each must know exactly where in the game-flow process the other machine is. Each must be kept apprised of changes in the "state of the game" that occur on the other system. If events are supposedly occurring in real time, when is "now," and from which machine's perspective? Does an event occur when it is recorded within the game system on the machine that initiates the event, or when it is recorded (and acknowledged) on the remote machine? Even in non–real time games, this can be a very significant issue.

The basic structure of the game-system that you are designing will probably fit better into one or the other of these models. With both of the modem-capable games that we have done, it was felt that the user-benefit of quicker feedback offered by the peer-to-peer model outweighed the developer burdens implied by that approach.

DATA CLASSIFICATION

As we develop our game, we must be aware that the process of updating certain data elements on our system may have ramifications on a second system's view of the game. Consequently, this second system will have to be informed of our change. We have found it quite helpful to establish classifications of data elements at the start of the project, and then when we need to add specific data elements, they are added in the appropriate category. With this and the judicious use of centralization of the data update functions, we can help ensure that all systems are informed when their piece of reality changes.

The following categorization strategy from *Empire Deluxe* will illustrate one approach to this. These classifications are fuzzy at best, and that there is some overlap.

- **Environment Data**—This encompasses the data elements that are specific to the environment in which the game is running on a single system. Included are such things as files, display-specific variables such as screen resolution, graphic elements, etc. Because it is specific to a single system, any remote systems will most likely have their own versions of this data, and it will not need to be synchronized between systems.
- **Static Core Data**—This is game-system–specific data that establishes the basic ground rules of a particular game. Once established, it won't change during the playing of the game. In *Empire Deluxe* this category included elements such as the size and terrain of the world, number of players and their names, game rules, and location (i.e., system) of players. On starting a game, this information needs to be communicated to all systems involved, but will not have to be updated during the game.
- **Volatile Core Data**—Most of the data elements for the game system fall into this category. It includes all variables that are used to control and evaluate the game's current state, which is why we also refer to this classification as state variables. Included might be elements such as whose turn it is, what units currently exist and what their attributes are, what their locations are in the world, etc. This data is necessary to assess the validity of a "command" and to actually execute the command and assess its effect on the state of the game. Depending on the architecture we decided on above, this data will either reside on a single system (master/slave) or will reside on multiple systems (peer-to-peer). In the latter case, the updates to these data elements must be synchronized between the various peers involved.

- **Player-Specific Data**—We make a distinction between data that is needed to evaluate the validity and effects of a command (Core Data) and data that is used to help determine those commands. An example of the latter is the Artificial Opponent's analysis data or a human player's pending (but not executed) orders for a unit. For example, in *Empire Deluxe*, a player can set up a "movement path," which is basically an instruction that says "whenever a unit of a given type enters Location X, it should be given a Move To command to go to Location Y." This data is only needed to issue a command to a unit. It is part of the player-specific data, and is used by the computer on which the player resides to automatically issue a Move To command to the "Core" when asked for a command for a qualifying unit. We note here that player-specific data is only maintained on the player's system.

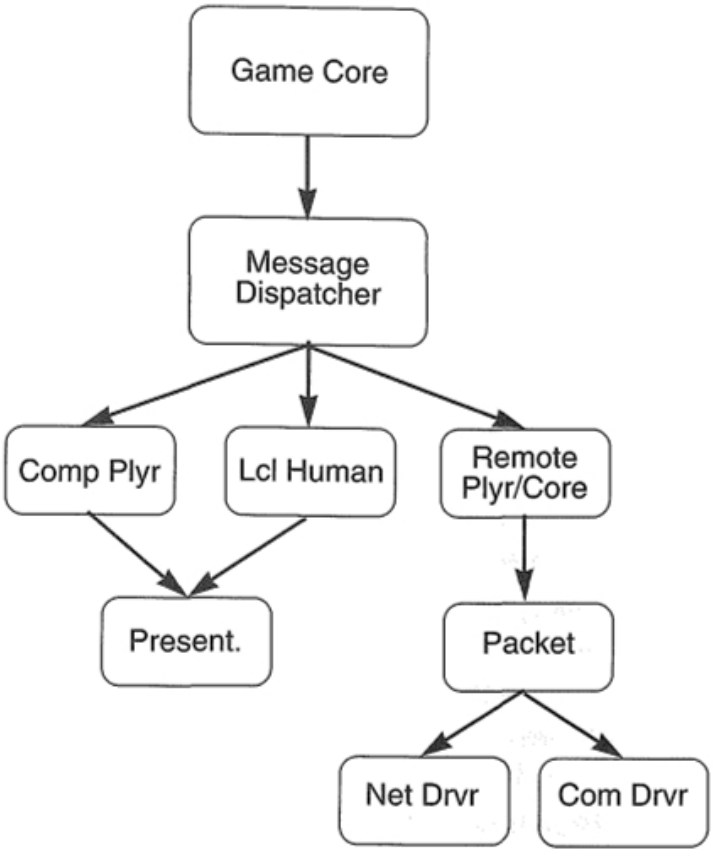

Figure D.3 Software layers

SOFTWARE LAYERS

Now that we've layered our data, let's examine an approach to layering the software, again abstracting from *Empire Deluxe*. Our objective was to isolate the actual game system from the knowledge of the type (human or computer) and location (local or remote) of the various players in the game. Planning ahead definitely makes things easier!

The Game Core

At the heart of the system is the Game Core. This is the layer that knows about the game rules and controls the flow of the game. It is responsible for updating all of the Game State data, for soliciting commands from the various players as appropriate, and for evaluating and executing those commands. It doesn't know how to talk directly with the players, nor does it know how to present information to the players. It only knows the game itself. All other layers can talk directly to the Core to issue commands.

As a separate layer, we have a Message Dispatcher. It is through this dispatcher that a message is routed to the appropriate recipient(s). Targets of messages include the game core(s) (multiple in the case of a peer-to-peer multimachine game) and one or more players. Messages are used for asking questions (such as which unit to process next or what command should be executed for a unit), informing the recipient of a state change ("Unit X just sighted an enemy unit."), and much more.

The Computer-controlled Opponent layer controls all decisions (sometimes referred to as

AI) made on behalf of a nonhuman player, and receives all Player Messages targeted to a computer-controlled player. Note that the Game Core does not really need to know who or what a player is, it just sends the messages to the Dispatcher, who determines whether to send them to a Computer Player layer, to a local human player driver, or to a remote message dispatcher. The AI layer can also call the Presentation Manager layer, if messages it processes involve presenting information to the person presumably watching the computer display.

The Local Human Player module receives all messages routed to a player playing on the local system. It will also call the Presentation Manager as appropriate, if the receiving player is the one presumed to be currently watching the action. It is this layer that actively solicits input from the player and translates that input into commands to be routed to the Game Core. It also manages the Player Specific Data layer for the player.

The Presentation Manager layer controls what is actually displayed on the screen, based on the messages that are routed to it.

A Remote Router module is the nucleus of the play-by-modem support. It communicates with the remote systems and handles the translation between the internal Message system and the external Packet Protocol system. It receives messages and translates them to Packet format and routes them to the Packet Protocol driver. It also receives validated Packets from the Protocol driver, parses the Packets, translates those packets back into internal Messages, and passes them to the Message Dispatcher.

We use a packet protocol to handle the communications between connected systems and to ensure that data is received correctly. The Packet Driver layer handles the details of sending packets (retaining them until acknowledged), identifying the packets contained in the received data stream and validating them, and sending either positive or negative acknowledgment back to the sender.

Assorted low-level layers also exist to support the above structure. Layers to handle windows and other graphic displays, handle input from mouse and/or keyboard, timers, etc., are vital. We also have low-level layers that actually talk to the serial ports and the local area network. Note that these low-level communication drivers know nothing about the higher-level data formats—they just know streams of data.

GAME-FLOW CONTROL AND SYNCHRONIZATION

The flow of the game is totally controlled by the Game Core layer, as described previously. As needed, this layer will send the appropriate messages to communicate with the outside layers. The only real issue is if we have a game system running on multiple systems, based on a peer-to-peer architecture. In this situation, we have the potential for chaos, because we have multiple directors trying to run the show. We need some means of synchronizing the activities on the two (or more) systems.

In the two games that we have done, we have taken different approaches to this problem. With *The Perfect General*, the synchronization was achieved via a dialog between the two systems, where one system would send an "I'm ready to do this" packet and wait for the other system to send a "Go ahead and do it" packet in response. While this approach worked, it was too vulnerable to synchronization problems. It also tended to slow down the game flow, due to communications delays.

Empire Deluxe's basic game design allowed us to implement a much more elegant solution. *Empire* is strictly a turn-based game, and as

such, one and only one player is really active at one time. Consequently, we really only needed to have one Core "active" at one time—the Core on which the active player is situated. This leads us to the concept of the Control System, and a protocol for the Control System to pass control to another (as the players are cycled). What has resulted from this approach is a modified master/slave architecture, except that each machine is at times the master and at other times the slave. Of course, all machines must maintain the Game Core data, as in the peer-to-peer architecture.

COMMUNICATIONS PROTOCOL

A telephone line is an imperfect medium for sending data. Further complications arise from the high demands that most games place on the computer system and the hardware limitations of the standard IBM PC regarding interrupt priorities and serial ports. Errors in transmitting and/or receiving data should be expected, and handled. We handle them by establishing a standard protocol that we use for communicating between systems.

All transmitted messages are constructed in a standard format. Every message sent will be composed of a common beginning, the Packet Header, followed by a variable data portion. The contents of the header will allow the remote system to both validate the data received and then to parse and interpret it. Borrowing yet again from *Empire Deluxe*, Figure D.4 shows the format of our Packet Header.

The Packet-ID element is a unique "start of a packet" cookie. For debugging purposes, we use an array of ASCII characters that are unlikely to appear within the body of a packet—in the case of *Empire Deluxe* we used the characters "!ED!". The packet driver will scan the incoming data stream, discarding any characters received until it finds this cookie.

The Sequence Number increases for every nonresponse packet sent by a system to a specific target. Each system maintains separate send and receive counters for each system with which it communicates. With the sequence number, it is quite easy to tell that a preceding packet was lost (in which case the receiving system can request that the packet be re-sent) and which packets are duplicates of previously received packets.

The From-System and To-System are the identifiers (assigned during the establishment of the connection) of the system sending the packet and the system to which the packet is targeted. This allows for the possible connection via a transport layer that echoes back to our system what we send out, by allowing a system to ignore a packet it receives if the sending system is itself. This also allows one system to effectively be able to act as a messenger if we are attempting to communicate with multiple systems daisy-chained together.

The Header CRC and Data CRC elements allow us to ensure that we have received a valid header and a valid variable data stream. If a byte is corrupted or dropped, these CRC values will not match the CRCs calculated on the receiving system, and the packet can be rejected.

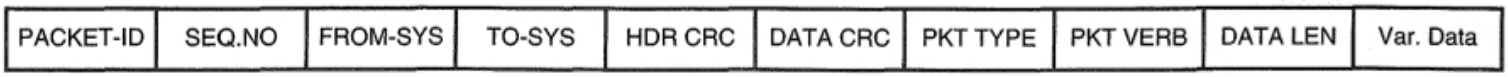

Figure D.4 Standard packet format

The Packet Type and Packet Verb actually identify the contents of the packet. The types of packets that we use in *Empire Deluxe* include "Startup Packets" used during the Game Setup transmission, "Data" packets used during the actual game play, "Message" packets used to transmit "chat" messages between players, and "Response" packets used to acknowledge (either positively or negatively) the receipt of a packet.

The Data Length and Data Contents will vary, based on the type of packet and the specific verb. For example, one of the Data packets used in *Empire Deluxe* has a verb that says "change City X's production value." The data-contents portion of the packet contains the City's identifier and the City's new production value.

"Minor" Differences

When designing the layout of the packets, one should keep in mind that the machines that are communicating may be architecturally quite different, and these differences should be accommodated during the design. This applies particularly to any binary numeric values larger than eight bits wide that need to be transmitted. An IBM PC and a Macintosh handle these values differently. In the two products we have created, we have taken two different approaches to this. In *The Perfect General*, all of the data packets were strictly 7-bit ASCII, so all numbers were just converted to ASCII strings, and semicolons were used to delimit fields within a packet. In *Empire Deluxe*, we decided to keep the data in binary format, and just agreed on the convention that all 16-bit or greater integer fields would be converted to Motorola (big-endian) format before transmission. Once we standardized the data format, it was relatively easy to be able to parse the data and convert it back to our "native" format on the PC.

On sending a packet, the initiating system will retain a copy of the packet until a Positive Acknowledgment is received for it. If no response is received for the packet within an arbitrary time-out period, the packet is re-sent. On receipt of a Negative Acknowledgment, the packet is also re-sent. On receipt of a Positive response, the packet is forgotten.

On receipt of a packet, the system examines the Packet Header. If the From-System is the system currently processing the packet, it is ignored. The header is then evaluated and the CRC calculated and compared with the Header CRC contained in the header. If the comparison is bad, a Negative response is sent. If good, the To-System is compared with the receiving system's ID. If not meant for this system, the packet is either ignored or passed on to the targeted system, depending on the connection architecture (daisy-chained or centralized). If targeted for this system, the sequence number is compared with the sequence number we are expecting from the sending system. If lower than the expected number, it is assumed to be a duplicate. We send a positive response and throw the packet away. If higher than the expected sequence, we assume that we missed the expected packet and send a negative response to the packet we are expecting, and discard the current packet. If the sequence number is as expected, we validate (CRC calculation) the data received, send a positive acknowledgment, and proceed to process the packet Type, Verb, and Data.

WINDING DOWN

The information presented here is by no means complete, but space constraints dictate that we end here. Additional nontrivial issues remain to be addressed, including the actual initiation of

connections and the establishment of the groundrules for the connection: the assignment of System IDs and of connection architecture (particularly if more than two systems are involved), and the identification of game rules, players involved, and the initial values needed for initialization of Game State data must be established. Also issues related to restarting a game in progress must be identified and solutions designed, because the likelihood of an interruption in connection during game play is too high to be ignored.

Hopefully, this appendix has identified some of the important design issues involved and provided you with some productive food for thought. While the design of play-by-modem ability is not simple, the results can be quite rewarding. Good luck!

Advanced-Game Unit-Type Production Times

This appendix lists the production times of each of the unit types in the Advanced Game of *Empire Deluxe* based on a city's production efficiency. For these tables, it is assumed that the player has a 100-percent efficient overall economy (i.e., has no production handicap or advantage and not so many units on the board that they are dragging down his economy). Unit types with identical production times have been combined, such as destroyers and submarines.

There are six tables per unit type depending on the two production conditions, initial or continuing (which is 1/6 faster than initial), and the three city specializations: none, specializing in that particular unit type (i.e., 20 percent faster), and specializing in a different unit type (i.e., 10 percent slower). These charts list only the production efficiencies at which the number of turns required to build changes. For example, the initial production of infantry takes 2 turns in a city with a production efficiency ranging from 241–250, but is only listed at 241 because that is the starting point for this change in production time. When the required number of turns to build a unit exceeded 999, the value is given as "–". Turns to produce are in bold.

TABLE E.1: INFANTRY-UNIT PRODUCTION TIME

INFANTRY: NO SPECIALTY, INITIAL PRODUCTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
600	**300**	**200**	**150**	**120**	**100**	**86**	**75**	**67**	**60**	**55**	**50**	**46**	**43**	**40**	**38**	**35**
18	19	20	21	22	23	24	25	26	27	28	30	31	33	35	37	39
33	**32**	**30**	**29**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**
42	45	49	53	58	64	71	81	93	110	134	172	241				
14	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**				

INFANTRY: NO SPECIALTY, CONTINUING PRODUCTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
500	**250**	**167**	**125**	**100**	**83**	**71**	**63**	**56**	**50**	**45**	**42**	**38**	**36**	**33**	**31**	**29**
18	19	20	21	22	23	24	25	26	28	29	31	33	35	38	41	44
28	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**
48	53	59	67	77	91	112	143	201								
10	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**								

INFANTRY: INFANTRY SPECIALTY, INITIAL PRODUCTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
480	**240**	**160**	**120**	**96**	**80**	**69**	**60**	**53**	**48**	**44**	**40**	**37**	**34**	**32**	**30**	**28**
18	19	20	21	22	23	24	25	26	28	30	31	34	36	39	42	46
27	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
51	57	65	74	88	107	138	193									
9	**8**	**7**	**6**	**5**	**4**	**3**	**2**									

INFANTRY: INFANTRY SPECIALTY, CONTINUING PRODUCTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
400	**200**	**133**	**100**	**80**	**67**	**57**	**50**	**44**	**40**	**36**	**33**	**31**	**29**	**27**	**25**	**24**
18	19	20	21	22	23	25	26	28	30	33	35	39	43	48	54	62
22	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**
73	89	115	161													
5	**4**	**3**	**2**													

INFANTRY: OTHER SPECIALTY, INITIAL PRODUCTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
660	**330**	**220**	**165**	**132**	**110**	**94**	**82**	**73**	**66**	**60**	**55**	**51**	**47**	**44**	**41**	**39**
18	19	20	21	22	23	24	25	26	27	29	30	31	33	34	36	38
37	**35**	**33**	**31**	**30**	**29**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**
40	43	46	49	53	58	63	70	78	88	102	120	147	189			
16	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**			

Infantry: Other Specialty, Continuing Production

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
550	**275**	**183**	**138**	**110**	**92**	**79**	**69**	**61**	**55**	**50**	**46**	**42**	**39**	**37**	**34**	**32**
18	19	20	21	22	23	24	25	26	27	29	30	32	34	36	38	41
31	**29**	**28**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**
45	48	53	58	65	74	85	101	123	158	221						
12	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**						

Table E.2: Armor/Fighter/Bomber-Unit Production Time

Armor/Fighter/Bomber: No Specialty, Initial Production

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
–	**600**	**400**	**300**	**240**	**200**	**171**	**150**	**133**	**120**	**109**	**100**	**92**	**86**	**80**	**75**	**71**
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
67	**63**	**60**	**57**	**55**	**52**	**50**	**48**	**46**	**44**	**43**	**41**	**40**	**39**	**38**	**36**	**35**
35	36	37	39	40	41	43	44	46	48	49	52	54	56	59	62	65
34	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**
69	73	78	83	89	97	105	115	127	142	161	185	219				
17	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**				

Armor/Fighter/Bomber: No Specialty, Continuing Production

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
–	**500**	**333**	**250**	**200**	**167**	**143**	**125**	**111**	**100**	**91**	**83**	**77**	**71**	**67**	**63**	**59**
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
56	**53**	**50**	**48**	**45**	**43**	**42**	**40**	**38**	**37**	**36**	**34**	**33**	**32**	**31**	**30**	**29**
36	37	38	40	41	43	45	47	49	52	55	58	61	65	69	75	81
28	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**
87	96	106	118	134	154	182	223									
11	**10**	**9**	**8**	**7**	**6**	**5**	**4**									

Armor/Fighter/Bomber: A/F/B Specialty, Initial Production

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
960	**480**	**320**	**240**	**192**	**160**	**137**	**120**	**107**	**96**	**87**	**80**	**74**	**69**	**64**	**60**	**56**
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
53	**51**	**48**	**46**	**44**	**42**	**40**	**38**	**37**	**36**	**34**	**33**	**32**	**31**	**30**	**29**	**28**
35	37	38	40	41	43	45	47	50	52	55	59	62	67	72	77	84
27	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**
92	102	113	129	148	175	214										
10	**9**	**8**	**7**	**6**	**5**	**4**										

Armor/Fighter/Bomber: A/F/B Specialty, Continuing Production

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
800	**400**	**267**	**200**	**160**	**133**	**114**	**100**	**89**	**80**	**73**	**67**	**62**	**57**	**53**	**50**	**47**
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	35
44	**42**	**40**	**38**	**36**	**35**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**
36	38	40	42	44	46	49	52	56	60	65	70	77	85	95	107	124
22	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**
146	178	229														
5	**4**	**3**														

Armor/Fighter/Bomber: Other Specialty, Initial Production

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
–	**660**	**440**	**330**	**264**	**220**	**189**	**165**	**147**	**132**	**120**	**110**	**102**	**94**	**88**	**82**	**78**
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
73	**69**	**66**	**63**	**60**	**57**	**55**	**53**	**51**	**49**	**47**	**46**	**44**	**43**	**41**	**40**	**39**
35	36	37	38	39	40	41	42	44	45	47	48	50	52	54	57	59
38	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**
62	65	68	72	76	80	86	92	98	106	115	126	139	156	176	204	240
21	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**

Armor/Fighter/Bomber: Other Specialty, Continuing Production

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
–	**550**	**367**	**275**	**220**	**183**	**157**	**138**	**122**	**110**	**100**	**92**	**85**	**79**	**73**	**69**	**65**
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
61	**58**	**55**	**52**	**50**	**48**	**46**	**44**	**42**	**41**	**39**	**38**	**37**	**35**	**34**	**33**	**32**
35	37	38	39	41	42	44	45	47	49	52	54	57	60	63	67	71
31	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**
76	82	89	96	105	116	130	147	170	201	245						
14	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**						

Table E.3: Destroyer/Submarine-Unit Production Time

Destroyer/Submarine: No Specialty, Initial Production

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
–	**800**	**600**	**480**	**400**	**343**	**300**	**267**	**240**	**218**	**200**	**185**	**171**	**160**	**150**	**141**	**133**
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
126	**120**	**114**	**109**	**104**	**100**	**96**	**92**	**89**	**86**	**83**	**80**	**77**	**75**	**73**	**71**	**69**
36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
67	**65**	**63**	**62**	**60**	**59**	**57**	**56**	**55**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**

53	54	56	57	58	60	61	63	65	66	68	70	72	74	77	79	82
45	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**
85	88	91	95	98	103	107	112	118	124	130	138	146	155	166	178	193
28	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**
209	229															
11	**10**															

Destroyer/Submarine: No Specialty, Continuing Production

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
–	**667**	**500**	**400**	**333**	**286**	**250**	**222**	**200**	**182**	**167**	**154**	**143**	**133**	**125**	**118**	**111**
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
105	**100**	**95**	**91**	**87**	**83**	**80**	**77**	**74**	**71**	**69**	**67**	**65**	**63**	**61**	**59**	**57**
36	37	38	39	40	41	42	43	44	45	46	48	49	50	51	52	54
56	**54**	**53**	**51**	**50**	**49**	**48**	**47**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**
55	57	58	60	62	64	66	68	71	73	76	79	82	86	89	94	98
36	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**
103	109	115	122	130	138	149	161	174	191	211	236					
19	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**					

Destroyer/Submarine: D/S Specialty, Initial Production

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
–	**960**	**640**	**480**	**384**	**320**	**274**	**240**	**213**	**192**	**175**	**160**	**148**	**137**	**128**	**120**	**113**
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
107	**101**	**96**	**91**	**87**	**83**	**80**	**77**	**74**	**71**	**69**	**66**	**64**	**62**	**60**	**58**	**56**
35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	52
55	**53**	**52**	**51**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**
53	55	56	58	60	61	63	66	68	70	73	76	79	82	86	90	94
36	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**
99	104	110	117	124	133	143	154	167	183	203	226					
19	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**					

Destroyer/Submarine: D/S Specialty, Continuing Production

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
–	**800**	**533**	**400**	**320**	**267**	**229**	**200**	**178**	**160**	**145**	**133**	**123**	**114**	**107**	**100**	**94**
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
89	**84**	**80**	**76**	**73**	**70**	**67**	**64**	**62**	**59**	**57**	**55**	**53**	**52**	**50**	**48**	**47**
35	36	37	38	39	40	41	42	43	44	46	47	48	50	51	53	55
46	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**
57	59	61	63	66	69	72	75	79	83	87	92	97	104	111	119	129
28	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**
140	153	169	189	214	247											
11	**10**	**9**	**8**	**7**	**6**											

Destroyer/Submarine: Other Specialty, Initial Production

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
–	**880**	**660**	**528**	**440**	**377**	**330**	**293**	**264**	**240**	**220**	**203**	**189**	**176**	**165**	**155**	**147**
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
139	**132**	**126**	**120**	**115**	**110**	**106**	**102**	**98**	**94**	**91**	**88**	**85**	**82**	**80**	**78**	**75**
36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
73	**71**	**69**	**68**	**66**	**64**	**63**	**61**	**60**	**59**	**57**	**56**	**55**	**54**	**53**	**52**	**51**
53	54	55	56	57	59	60	61	63	64	66	67	69	71	73	75	77
50	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**
79	82	84	87	90	93	96	100	104	108	113	118	123	129	136	143	151
33	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**
160	171	183	196	212	230											
16	**15**	**14**	**13**	**12**	**11**											

Destroyer/Submarine: Other Specialty, Continuing Production

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
–	**733**	**550**	**440**	**367**	**314**	**275**	**244**	**220**	**200**	**183**	**169**	**157**	**147**	**138**	**129**	**122**
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
116	**110**	**105**	**100**	**96**	**92**	**88**	**85**	**81**	**79**	**76**	**73**	**71**	**69**	**67**	**65**	**63**
36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
61	**59**	**58**	**56**	**55**	**54**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**
54	55	56	58	59	61	62	64	66	68	70	73	75	78	81	84	87
41	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**
90	94	98	103	108	113	119	126	134	142	152	163	177	192	210	232	
24	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	

Table E.4: Transport-Unit Production Time

Transport: No Specialty, Initial Production

1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
–	**750**	**600**	**500**	**429**	**375**	**333**	**300**	**273**	**250**	**231**	**214**	**200**	**188**	**176**	**167**	**158**
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
150	**143**	**136**	**130**	**125**	**120**	**115**	**111**	**107**	**103**	**100**	**97**	**94**	**91**	**88**	**86**	**83**
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
81	**79**	**77**	**75**	**73**	**71**	**70**	**68**	**67**	**65**	**64**	**62**	**61**	**60**	**59**	**58**	**57**
54	55	56	57	58	59	60	61	62	64	65	66	68	69	71	73	75
56	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**
76	78	81	83	85	87	90	93	96	99	102	106	110	114	118	123	128
39	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**
134	140	147	154	163	172	182	194	207	223	241						
22	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**						

Transport: No Specialty, Continuing Production

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
–	**833**	**625**	**500**	**417**	**357**	**313**	**278**	**250**	**227**	**208**	**192**	**179**	**167**	**156**	**147**	**139**
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
132	**125**	**119**	**114**	**109**	**104**	**100**	**96**	**93**	**89**	**86**	**83**	**81**	**78**	**76**	**74**	**71**
36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
69	**68**	**66**	**64**	**63**	**61**	**60**	**58**	**57**	**56**	**54**	**53**	**52**	**51**	**50**	**49**	**48**
53	54	55	57	58	59	61	62	64	65	67	69	71	73	75	77	80
47	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**
82	85	88	91	95	99	103	107	112	117	122	129	136	143	152	162	173
30	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**
186	201	218	239													
13	**12**	**11**	**10**													

Transport: Transport Specialty, Initial Production

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
–	**800**	**600**	**480**	**400**	**343**	**300**	**267**	**240**	**218**	**200**	**185**	**171**	**160**	**150**	**141**	**133**
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
126	**120**	**114**	**109**	**104**	**100**	**96**	**92**	**89**	**86**	**83**	**80**	**77**	**75**	**73**	**71**	**69**
36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
67	**65**	**63**	**62**	**60**	**59**	**57**	**56**	**55**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**
53	54	56	57	58	60	61	63	65	66	68	70	72	74	77	79	82
45	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**
85	88	91	95	98	103	107	112	118	124	130	138	146	155	166	178	193
28	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**
209	229															
11	**10**															

Transport: Transport Specialty, Continuing Production

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
–	**667**	**500**	**400**	**333**	**286**	**250**	**222**	**200**	**182**	**167**	**154**	**143**	**133**	**125**	**118**	**111**
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
105	**100**	**95**	**91**	**87**	**83**	**80**	**77**	**74**	**71**	**69**	**67**	**65**	**63**	**61**	**59**	**57**
36	37	38	39	40	41	42	43	44	45	46	48	49	50	51	52	54
56	**54**	**53**	**51**	**50**	**49**	**48**	**47**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**
55	57	58	60	62	64	66	68	71	73	76	79	82	86	89	94	98
36	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**
103	109	115	122	130	138	149	161	174	191	211	236					
19	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**					

Transport: Other Specialty, Initial Production

1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
–	**825**	**660**	**550**	**471**	**413**	**367**	**330**	**300**	**275**	**254**	**236**	**220**	**206**	**194**	**183**	**174**
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
165	**157**	**150**	**143**	**138**	**132**	**127**	**122**	**118**	**114**	**110**	**106**	**103**	**100**	**97**	**94**	**92**
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
89	**87**	**85**	**83**	**80**	**79**	**77**	**75**	**73**	**72**	**70**	**69**	**67**	**66**	**65**	**63**	**62**
54	55	56	57	58	59	60	61	62	63	65	66	67	69	70	71	73
61	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**
75	76	78	80	82	84	86	89	91	93	96	99	102	105	109	112	116
44	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**
121	125	130	135	141	147	154	161	170	179	189	201	213	228	245		
27	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**		

Transport: Other Specialty, Continuing Production

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
–	**917**	**688**	**550**	**458**	**393**	**344**	**306**	**275**	**250**	**229**	**212**	**196**	**183**	**172**	**162**	**153**
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
145	**138**	**131**	**125**	**120**	**115**	**110**	**106**	**102**	**98**	**95**	**92**	**89**	**86**	**83**	**81**	**79**
36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
76	**74**	**72**	**71**	**69**	**67**	**65**	**64**	**63**	**61**	**60**	**59**	**57**	**56**	**55**	**54**	**53**
53	54	55	56	57	58	60	61	62	64	65	67	68	70	72	74	76
52	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**
78	80	83	85	88	91	94	97	101	104	108	113	118	123	128	135	142
35	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**
149	158	167	178	190	204	221	240									
18	**17**	**16**	**15**	**14**	**13**	**12**	**11**									

Table E.5: Cruiser-Unit Production Time

Cruiser: No Specialty, Initial Production

1	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
–	**840**	**700**	**600**	**525**	**467**	**420**	**382**	**350**	**323**	**300**	**280**	**263**	**247**	**233**	**221**	**210**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
200	**191**	**183**	**175**	**168**	**162**	**156**	**150**	**145**	**140**	**135**	**131**	**127**	**124**	**120**	**117**	**114**
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
111	**108**	**105**	**102**	**100**	**98**	**95**	**93**	**91**	**89**	**88**	**86**	**84**	**82**	**81**	**79**	**78**
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
76	**75**	**74**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**

72	74	75	76	78	79	81	82	84	85	87	89	91	93	95	97	99
58	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**
102	104	107	110	113	116	119	122	126	130	134	138	143	148	153	159	165
41	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**
172	179	187	196	205	216	228	241									
24	**23**	**22**	**21**	**20**	**19**	**18**	**17**									

Cruiser: No Specialty, Continuing Production

1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
–	**875**	**700**	**583**	**500**	**438**	**389**	**350**	**318**	**292**	**269**	**250**	**233**	**219**	**206**	**194**	**184**
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
175	**167**	**159**	**152**	**146**	**140**	**135**	**130**	**125**	**121**	**117**	**113**	**109**	**106**	**103**	**100**	**97**
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
95	**92**	**90**	**88**	**85**	**83**	**81**	**80**	**78**	**76**	**74**	**73**	**71**	**70**	**69**	**67**	**66**
54	55	56	57	58	59	60	61	62	64	65	66	67	68	70	71	73
65	**64**	**63**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**
74	76	77	79	81	83	85	87	89	91	94	96	99	102	105	108	112
47	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**
115	119	123	128	133	138	143	149	156	163	171	180	190	201	213	226	242
30	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**

Cruiser: Cruiser Specialty, Initial Production

1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
–	**840**	**672**	**560**	**480**	**420**	**373**	**336**	**305**	**280**	**258**	**240**	**224**	**210**	**198**	**187**	**177**
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
168	**160**	**153**	**146**	**140**	**134**	**129**	**124**	**120**	**116**	**112**	**108**	**105**	**102**	**99**	**96**	**93**
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
91	**88**	**86**	**84**	**82**	**80**	**78**	**76**	**75**	**73**	**71**	**70**	**69**	**67**	**66**	**65**	**63**
54	55	56	57	58	59	60	61	62	63	64	66	67	68	70	71	73
62	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**
74	76	78	80	81	83	86	88	90	93	95	98	101	104	107	111	114
45	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**
118	123	127	132	138	143	150	157	164	173	182	192	204	217	232	249	
28	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	

Cruiser: Cruiser Specialty, Continuing Production

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
–	**933**	**700**	**560**	**467**	**400**	**350**	**311**	**280**	**255**	**233**	**215**	**200**	**187**	**175**	**165**	**156**
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
147	**140**	**133**	**127**	**122**	**117**	**112**	**108**	**104**	**100**	**97**	**93**	**90**	**88**	**85**	**82**	**80**

36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
78	**76**	**74**	**72**	**70**	**68**	**67**	**65**	**64**	**62**	**61**	**60**	**58**	**57**	**56**	**55**	**54**
53	54	55	56	57	58	59	61	62	63	65	66	68	70	71	73	75
53	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**
77	79	82	84	87	89	92	95	99	102	106	110	115	120	125	131	137
36	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**
144	152	161	170	181	194	208	225	244								
19	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**								

Cruiser: Other Specialty, Initial Production

1	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
–	**924**	**770**	**660**	**578**	**513**	**462**	**420**	**385**	**355**	**330**	**308**	**289**	**272**	**257**	**243**	**231**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
220	**210**	**201**	**193**	**185**	**178**	**171**	**165**	**159**	**154**	**149**	**144**	**140**	**136**	**132**	**128**	**125**
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
122	**118**	**116**	**113**	**110**	**107**	**105**	**103**	**100**	**98**	**96**	**94**	**92**	**91**	**89**	**87**	**86**
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
84	**83**	**81**	**80**	**78**	**77**	**76**	**75**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**
72	73	74	76	77	78	79	81	82	84	85	87	89	90	92	94	96
84	**83**	**81**	**80**	**78**	**77**	**76**	**75**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**
98	100	102	104	107	109	112	115	117	121	124	127	131	134	138	143	147
47	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**
152	157	163	169	175	182	189	197	206	215	226	237	250				
30	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**				

Cruiser: Other Specialty, Continuing Production

1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
–	**963**	**770**	**642**	**550**	**481**	**428**	**385**	**350**	**321**	**296**	**275**	**257**	**241**	**226**	**214**	**203**
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
193	**183**	**175**	**167**	**160**	**154**	**148**	**143**	**138**	**133**	**128**	**124**	**120**	**117**	**113**	**110**	**107**
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
104	**101**	**99**	**96**	**94**	**92**	**90**	**88**	**86**	**84**	**82**	**80**	**79**	**77**	**75**	**74**	**73**
54	55	56	57	58	59	60	61	62	63	64	65	66	67	69	70	71
71	**70**	**69**	**68**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**
72	74	75	77	78	80	82	83	85	87	89	91	93	96	98	101	103
53	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**
106	109	112	115	119	123	127	131	136	140	146	151	158	164	172	180	188
36	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**
198	209	221	234	249												
19	**18**	**17**	**16**	**15**												

Table E.6: Carrier-Unit Production Time

Carrier: No Specialty, Initial Production

1	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
–	**960**	**800**	**686**	**600**	**533**	**480**	**436**	**400**	**369**	**343**	**320**	**300**	**282**	**267**	**253**	**240**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
229	**218**	**209**	**200**	**192**	**185**	**178**	**171**	**166**	**160**	**155**	**150**	**145**	**141**	**137**	**133**	**130**
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
126	**123**	**120**	**117**	**114**	**112**	**109**	**107**	**104**	**102**	**100**	**98**	**96**	**94**	**92**	**91**	**89**
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
87	**86**	**84**	**83**	**81**	**80**	**79**	**77**	**76**	**75**	**74**	**73**	**72**	**71**	**70**	**69**	**68**
72	73	74	75	76	77	79	80	81	83	84	85	87	89	90	92	94
67	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**
96	97	99	102	104	106	108	111	113	116	119	122	125	129	132	136	140
50	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**
144	148	153	158	163	169	175	182	189	196	205	214	224	235	247		
33	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**		

Carrier: No Specialty, Continuing Production

1	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
–	**800**	**667**	**571**	**500**	**444**	**400**	**364**	**333**	**308**	**286**	**267**	**250**	**235**	**222**	**211**	**200**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
190	**182**	**174**	**167**	**160**	**154**	**148**	**143**	**138**	**133**	**129**	**125**	**121**	**118**	**114**	**111**	**108**
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
105	**103**	**100**	**98**	**95**	**93**	**91**	**89**	**87**	**85**	**83**	**82**	**80**	**78**	**77**	**75**	**74**
55	56	57	58	59	60	61	62	63	65	66	67	68	69	70	71	73
73	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**
74	75	77	78	80	81	83	85	87	88	90	92	95	97	99	102	104
54	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**
107	110	113	116	120	124	127	132	136	141	146	151	157	164	171	178	187
37	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**
196	206	217	229	243												
20	**19**	**18**	**17**	**16**												

Carrier: Carrier Specialty, Initial Production

1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
–	**960**	**768**	**640**	**549**	**480**	**427**	**384**	**349**	**320**	**295**	**274**	**256**	**240**	**226**	**213**	**202**
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
192	**183**	**175**	**167**	**160**	**154**	**148**	**142**	**137**	**132**	**128**	**124**	**120**	**116**	**113**	**110**	**107**
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
104	**101**	**98**	**96**	**94**	**91**	**89**	**87**	**85**	**83**	**82**	**80**	**78**	**77**	**75**	**74**	**72**

54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	70	71
71	**70**	**69**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**
72	74	75	77	78	80	81	83	85	87	89	91	93	95	98	100	103
53	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**
106	109	112	115	119	122	126	131	135	140	145	151	157	164	171	179	188
36	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**
197	208	220	233	248												
19	**18**	**17**	**16**	**15**												

Carrier: Carrier Specialty, Continuing Production

1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
–	**800**	**640**	**533**	**457**	**400**	**356**	**320**	**291**	**267**	**246**	**229**	**213**	**200**	**188**	**178**	**168**
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
160	**152**	**145**	**139**	**133**	**128**	**123**	**119**	**114**	**110**	**107**	**103**	**100**	**97**	**94**	**91**	**89**
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
86	**84**	**82**	**80**	**78**	**76**	**74**	**73**	**71**	**70**	**68**	**67**	**65**	**64**	**63**	**62**	**60**
54	55	56	57	58	59	60	61	63	64	65	66	68	69	71	72	74
59	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**
76	78	80	82	84	86	88	91	93	96	99	102	105	109	113	117	121
42	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**
126	131	137	143	149	157	165	173	183	194	207	221	238				
25	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**				

Carrier: Other Specialty, Initial Production

1	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
–	**880**	**754**	**660**	**587**	**528**	**480**	**440**	**406**	**377**	**352**	**330**	**311**	**293**	**278**	**264**	**251**
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
240	**230**	**220**	**211**	**203**	**196**	**189**	**182**	**176**	**170**	**165**	**160**	**155**	**151**	**147**	**143**	**139**
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
135	**132**	**129**	**126**	**123**	**120**	**117**	**115**	**112**	**110**	**108**	**106**	**104**	**102**	**100**	**98**	**96**
56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
94	**93**	**91**	**89**	**88**	**87**	**85**	**84**	**82**	**81**	**80**	**79**	**78**	**77**	**75**	**74**	**73**
73	74	75	76	78	79	80	81	82	84	85	86	88	89	91	92	94
72	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**
96	97	99	101	103	105	107	109	112	114	117	119	122	125	128	131	134
55	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**
138	141	145	149	154	158	163	168	174	179	186	192	200	208	216	225	235
38	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**
246																
21																

Carrier: Other Specialty, Continuing Production

1	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
–	**880**	**733**	**629**	**550**	**489**	**440**	**400**	**367**	**338**	**314**	**293**	**275**	**259**	**244**	**232**	**220**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
210	**200**	**191**	**183**	**176**	**169**	**163**	**157**	**152**	**147**	**142**	**138**	**133**	**129**	**126**	**122**	**119**
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
116	**113**	**110**	**107**	**105**	**102**	**100**	**98**	**96**	**94**	**92**	**90**	**88**	**86**	**85**	**83**	**81**
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
80	**79**	**77**	**76**	**75**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**
72	73	74	76	77	78	80	81	83	84	86	88	89	91	93	95	97
61	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**
99	102	104	107	109	112	115	118	121	124	128	132	136	140	145	150	155
44	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**
161	167	173	180	188	196	205	215	226	238							
27	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**							

Table E.7: Battleship-Unit Production Time

Battleship: No Specialty, Initial Production

1	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
–	**857**	**750**	**667**	**600**	**545**	**500**	**462**	**429**	**400**	**375**	**353**	**333**	**316**	**300**	**286**	**273**
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
261	**250**	**240**	**231**	**222**	**214**	**207**	**200**	**194**	**188**	**182**	**176**	**171**	**167**	**162**	**158**	**154**
40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
150	**146**	**143**	**140**	**136**	**133**	**130**	**128**	**125**	**122**	**120**	**118**	**115**	**113**	**111**	**109**	**107**
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
105	**103**	**102**	**100**	**98**	**97**	**95**	**94**	**92**	**91**	**90**	**88**	**87**	**86**	**85**	**83**	**82**
74	75	76	77	78	79	80	81	82	83	84	86	87	88	89	91	92
81	**80**	**79**	**78**	**77**	**76**	**75**	**74**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**
94	95	96	98	100	101	103	105	107	109	111	113	115	117	119	122	124
64	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**
127	130	132	135	138	142	145	149	152	156	161	165	170	174	180	185	191
47	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**
197	204	211	219	227	236	245										
30	**29**	**28**	**27**	**26**	**25**	**24**										

Battleship: No Specialty, Continuing Production

1	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
–	**833**	**714**	**625**	**556**	**500**	**455**	**417**	**385**	**357**	**333**	**313**	**294**	**278**	**263**	**250**	**238**
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
227	**217**	**208**	**200**	**192**	**185**	**179**	**172**	**167**	**161**	**156**	**152**	**147**	**143**	**139**	**135**	**132**
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
128	**125**	**122**	**119**	**116**	**114**	**111**	**109**	**106**	**104**	**102**	**100**	**98**	**96**	**94**	**93**	**91**
56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
89	**88**	**86**	**85**	**83**	**82**	**81**	**79**	**78**	**77**	**76**	**75**	**74**	**72**	**71**	**70**	**69**
73	75	76	77	78	79	81	82	83	85	86	87	89	91	92	94	96
68	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**
98	100	102	104	106	108	110	113	115	118	121	124	127	130	134	137	141
51	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**
145	150	154	159	164	170	176	182	189	197	205	213	223	233	244		
34	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**		

Battleship: Battleship Specialty, Initial Production

1	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
–	**960**	**800**	**686**	**600**	**533**	**480**	**436**	**400**	**369**	**343**	**320**	**300**	**282**	**267**	**253**	**240**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
229	**218**	**209**	**200**	**192**	**185**	**178**	**171**	**166**	**160**	**155**	**150**	**145**	**141**	**137**	**133**	**130**
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
126	**123**	**120**	**117**	**114**	**112**	**109**	**107**	**104**	**102**	**100**	**98**	**96**	**94**	**92**	**91**	**89**
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
87	**86**	**84**	**83**	**81**	**80**	**79**	**77**	**76**	**75**	**74**	**73**	**72**	**71**	**70**	**69**	**68**
72	73	74	75	76	77	79	80	81	83	84	85	87	89	90	92	94
67	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**
96	97	99	102	104	106	108	111	113	116	119	122	125	129	132	136	140
50	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**	**36**	**35**	**34**
144	148	153	158	163	169	175	182	189	196	205	214	224	235	247		
33	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**		

Battleship: Battleship Specialty, Continuing Production

1	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
–	**800**	**667**	**571**	**500**	**444**	**400**	**364**	**333**	**308**	**286**	**267**	**250**	**235**	**222**	**211**	**200**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
190	**182**	**174**	**167**	**160**	**154**	**148**	**143**	**138**	**133**	**129**	**125**	**121**	**118**	**114**	**111**	**108**
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
105	**103**	**100**	**98**	**95**	**93**	**91**	**89**	**87**	**85**	**83**	**82**	**80**	**78**	**77**	**75**	**74**
55	56	57	58	59	60	61	62	63	65	66	67	68	69	70	71	73
73	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**

74	75	77	78	80	81	83	85	87	88	90	92	95	97	99	102	104
54	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**
107	110	113	116	120	124	127	132	136	141	146	151	157	164	171	178	187
37	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**
196	206	217	229	243												
20	**19**	**18**	**17**	**16**												

Battleship: Other Specialty, Initial Production

1	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
–	**943**	**825**	**733**	**660**	**600**	**550**	**508**	**471**	**440**	**413**	**388**	**367**	**347**	**330**	**314**	**300**
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
287	**275**	**264**	**254**	**244**	**236**	**228**	**220**	**213**	**206**	**200**	**194**	**189**	**183**	**178**	**174**	**169**
40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
165	**161**	**157**	**153**	**150**	**147**	**143**	**140**	**138**	**135**	**132**	**129**	**127**	**125**	**122**	**120**	**118**
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
116	**114**	**112**	**110**	**108**	**106**	**105**	**103**	**102**	**100**	**99**	**97**	**96**	**94**	**93**	**92**	**90**
74	75	76	77	78	79	80	81	82	84	85	86	87	88	89	90	92
89	**88**	**87**	**86**	**85**	**84**	**83**	**81**	**80**	**79**	**78**	**77**	**76**	**75**	**74**	**73**	**72**
93	94	95	97	98	100	101	103	104	106	108	110	111	113	115	117	119
71	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**
122	124	126	129	131	134	137	139	142	146	149	152	156	160	163	168	172
54	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**
177	181	186	192	198	204	210	217	224	232	241	250					
37	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**					

Battleship: Other Specialty, Continuing Production

1	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
–	**917**	**786**	**688**	**611**	**550**	**500**	**458**	**423**	**393**	**367**	**344**	**324**	**306**	**289**	**275**	**262**
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
250	**239**	**229**	**220**	**212**	**204**	**196**	**190**	**183**	**177**	**172**	**167**	**162**	**157**	**153**	**149**	**145**
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
141	**138**	**134**	**131**	**128**	**125**	**122**	**120**	**117**	**115**	**112**	**110**	**108**	**106**	**104**	**102**	**100**
56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
98	**96**	**95**	**93**	**92**	**90**	**89**	**87**	**86**	**85**	**83**	**82**	**81**	**80**	**79**	**77**	**76**
73	74	75	76	77	79	80	81	82	83	84	86	87	89	90	91	93
75	**74**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**
95	96	98	100	101	103	105	107	109	112	114	116	119	121	124	127	130
58	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**
133	136	140	143	147	151	155	160	165	170	175	181	187	193	201	208	216
41	**40**	**39**	**38**	**37**	**36**	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**
225	235	245														
24	**23**	**22**														

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5.3 Land Terrain Effects Chart

Combat Modifier When A Land Unit is Defending in, Verses:

Terrain Type	Slows Armor Into?	A Land Attack	An Air Attack	A Sea Attack
Water	Prohib.	None	None	None
Clear	No	None	None	Land Unit 1/2
Rough	Yes	None	None	Land Unit 1/2
River	Yes	Arm. 1/2	None	Land Unit 1/2
Forest	Yes	Arm. 1/2	Air Units 1/2	None
Mountain	Prohib.	Arm. 1/2*	Air Units 1/2	None
City	No	Ignored	See Notes	Prohibited

* = *Armor units cannot advance after a successful attack into a mountain square.*

Land units defending in a city are ignored against an enemy attack by land. Instead, the city defends itself and, if it loses, any units in it are automatically eliminated.

Air units "bomb" cities in a manner different from all other types of attacks. A random target in the square is selected (including the city's current production and, against bombers, its production efficiency). Any target in these attacks is destroyed by a single hit. Fighters bomb cities with a 1/2 attack value. Chapters 9 and 10 have more details about the effects of bombing cities.

Important note: For combat, it only matters what square the defending unit is in. The square the attacker is coming from has no bearing on combat.

Computer Player "Hate"

+5 Per *attack* against a computer player's units (win or lose)
+10 Per *attack* against a computer player's cities (win or lose)

-1 Per turn (*automatic*)

All computer player "hate" scales cannot fall below 0 nor rise above 100

16.2 Percent Chance of Capturing a Neutral City

Attack Against It	Percent Chance of Capture
First	1/2 or 50%
Second	2/3 or 66%
Third	3/4 or 75%
Fourth	4/5 or 80%
Fifth	5/6 or 83%
Sixth	6/7 or 86%
and so on. . .	

Combined Advanced Unit Capabilities Chart

Unit	Turns 2 Produce	Move	Move Range	Attack	Defense	Damage	Shot Damage	Sight Range	Unsightable
Infantry	6/5	1	N/A	2	$2^{1,2}$	1	1	1^{7}	Subs
Armor	12/10	2	N/A	2	$2^{1,3}$	2	1	1^{7}	Subs
Airbase	N/A	N/A	N/A	N/A	2^{3}	1	1	2	Subs
Fighter	12/10	6	18	2^{4}	2	1	1	2	Subs
Bomber	12/10	4	24	2^{5}	2^{5}	1	2	2	Subs
Transport	30/25	2	N/A	1	1	3	1	1^{7}	Subs
Destroyer	24/20	3	N/A	2^{6}	2	3	1	1^{7}	-
Submarine	24/20	2	N/A	2^{6}	1	2	3	1	Land, Air
Cruiser	36/30	2	N/A	2^{6}	2	8	2	1^{7}	-
Battleship	60/50	2	N/A	2^{6}	2	12	3	1^{7}	Subs
Carrier	48/40	2	N/A	1	2	8	1	1^{7}	Subs
City	N/A	N/A	N/A	N/A	2	1	1	2	-

Notes:
1) 1/2 versus shore bombardment
2) Defense x2 when in forest, mountain, or when attacked by an armor on a river
3) Defense x2 when in forest or when attacked by an armor on a river
4) Attack of 1 when bombing cities
5) Attack and defense of 1 versus fighters
6) Attack of 1 versus planes
7) Sighting range of 2 against planes

16.1 Handicap "Advantage" Percentages

Handicap	Overall Production & Combat Efficiency Rating Percentage	Combat Formula Efficiency Multiplier	Comparative Turns to Build a Plane
Advantage 3	400.0%	4.000*	3
Advantage 2	200.0%	2.000	6
Advantage 1	133.0%	1.333	9
None	100.0%	1.000	12
Slight	90.9%	0.909	13
Moderate	80.0%	0.800	15
Average	66.7%	0.667	18
High	57.1%	0.571	21
Severe	44.4%	0.444	27
Extreme	33.3%	0.333	36

* = Automatically captures *neutral* cities when attacking.

10.2 The Economic Equivalency Chart

1 infantry	= 1 infantry unit
1 air base	= 1 infantry unit or 1 armor unit
1 armor	= 2 infantry units
1 fighter	= 2 infantry units
1 bomber	= 2 infantry units
1 destroyer	= 4 infantry units
1 submarine	= 4 infantry units
1 transport	= 5 infantry units
1 cruiser	= 6 infantry units
1 aircraft carrier	= 8 infantry units
1 battleship	= 10 infantry units
1 transport (fully loaded)	= 11 infantry units
1 air base (with 8 airplanes)	= 17 infantry units
1 aircraft carrier (fully loaded)	= 24 infantry units

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